AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

S. HRG. 110–205

NUCLEAR AND STRATEGIC POLICY OPTIONS

HEARING

BEFORE THE

SUBCOMMITTEE ON STRATEGIC FORCES

OF THE

COMMITTEE ON ARMED SERVICES
UNITED STATES SENATE

ONE HUNDRED TENTH CONGRESS

FIRST SESSION

MARCH 21, 2007

Printed for the use of the Committee on Armed Services

U.S. GOVERNMENT PRINTING OFFICE
39–487 PDF WASHINGTON : 2007

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512–1800; DC area (202) 512–1800
Fax: (202) 512–2104 Mail: Stop IDCC, Washington, DC 20402–0001

COMMITTEE ON ARMED SERVICES

CARL LEVIN, Michigan, *Chairman*

EDWARD M. KENNEDY, Massachusetts
ROBERT C. BYRD, West Virginia
JOSEPH I. LIEBERMAN, Connecticut
JACK REED, Rhode Island
DANIEL K. AKAKA, Hawaii
BILL NELSON, Florida
E. BENJAMIN NELSON, Nebraska
EVAN BAYH, Indiana
HILLARY RODHAM CLINTON, New York
MARK L. PRYOR, Arkansas
JIM WEBB, Virginia
CLAIRE McCASKILL, Missouri

JOHN McCAIN, Arizona
JOHN WARNER, Virginia,
JAMES M. INHOFE, Oklahoma
JEFF SESSIONS, Alabama
SUSAN M. COLLINS, Maine
JOHN ENSIGN, Nevada
SAXBY CHAMBLISS, Georgia
LINDSEY O. GRAHAM, South Carolina
ELIZABETH DOLE, North Carolina
JOHN CORNYN, Texas
JOHN THUNE, South Dakota
MEL MARTINEZ, Florida

Richard D. DeBobes, *Staff Director*
Michael V. Kostiw, *Replublican Staff Director*

Subcommittee on Strategic Forces

BILL NELSON, Florida, *Chairman*

ROBERT C. BYRD, West Virginia
JACK REED, Rhode Island
E. BENJAMIN NELSON, Nebraska
MARK L. PRYOR, Arkansas

JEFF SESSIONS, Alabama
JAMES M. INHOFE, Oklahoma
LINDSEY O. GRAHAM, South Carolina
JOHN THUNE, South Dakota

C O N T E N T S

CHRONOLOGICAL LIST OF WITNESSES

NUCLEAR AND STRATEGIC POLICY OPTIONS

MARCH 21, 2007

Page

Drell, Sidney D., Senior Fellow, Hoover Institution, Professor Emeritus, Stanford Linear Accelerator Center, Stanford University 5

Payne, Keith B., Professor and Department Head, Graduate Department of Defense and Strategic Studies, Missouri State University 54

Gallucci, Robert L., Dean, Edmund A. Walsh School of Foreign Service, Georgetown University 76

NUCLEAR AND STRATEGIC POLICY OPTIONS

WEDNESDAY, MARCH 21, 2007

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC FORCES,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

The subcommittee met, pursuant to notice, at 10:37 a.m. in room SR–222, Russell Senate Office Building, Senator Bill Nelson (chairman of the subcommittee) presiding.

Committee members present: Senators Bill Nelson, Reed, E. Benjamin Nelson, Sessions, and Thune.

Committee staff member present: John H. Quirk V, security clerk.

Majority staff member present: Madelyn R. Creedon, counsel.

Minority staff members present: Michael V. Kostiw, Republican staff director; Lynn F. Rusten, professional staff member; Jill L. Simodejka, research assistant; Robert M. Soofer, professional staff member; and Kristine L. Svinicki, professional staff member.

Staff assistants present: Kevin A. Cronin and Jessica L. Kingston.

Committee members' assistants present: Elizabeth King, assistant to Senator Reed; Christopher Caple and Caroline Tess, assistants to Senator Bill Nelson; Eric Pierce, assistant to Senator Ben Nelson; and Stuart C. Mallory, assistant to Senator Thune.

OPENING STATEMENT OF SENATOR BILL NELSON, CHAIRMAN

Senator BILL NELSON. Good morning, and thank you all for coming. You all are specialists in the area that we want to examine.

Dr. Drell, I want to particularly thank you for coming all the way from California to be with us.

Dr. Drell, Dean Gallucci, and Dr. Payne, you all have prepared statements. We're going to put them in the record, and I'm going to ask if you all would just talk to us. That'll save a lot of time and we can have a conversation.

We are here today for a much-needed discussion on nuclear and strategic policy. We are on the verge of several key decisions with respect to nuclear weapons and the nuclear weapons complex, and it's going to have a huge impact on the direction that our country is going to take.

The Strategic Arms Reduction Treaty (START), which was the last nuclear weapons treaty between the U.S. and the Soviet Union, is going to expire in 2009 unless both sides agree to extend all or part of it. It's been 15 years since the end of the Cold War, and the executive branch is now proposing to begin a new nuclear warhead program and to consolidate and modernize the nuclear weapons complex. So, it's time for us to have new ideas and to ask, do we need to modernize? If so, how and by how many?

[The prepared statement of Senator Bill Nelson follows:]

PREPARED STATEMENT BY SENATOR BILL NELSON

Good Morning. I would like to welcome our witnesses this morning. I would also like to thank you all for being here this morning. None of you are government witnesses and as a result you are all volunteers taking time out of your real jobs to share your thoughts with us. Dr. Drell, I particularly want to thank you for coming from California to be here this morning.

Dr. Drell, Dean Gallucci, and Dr. Payne, I know that you all have prepared statements and Dr. Drell, you have an article that you would like included in the record, and without objection we will include those documents. Dr. Payne, in your prepared statement you mentioned that you also had an article that you would like included in the record. If you have a copy of that article, we would be happy to include that as well.

We are here today to have a long delayed, but much needed discussion on nuclear and strategic policy. The United States is on the verge of several key decisions with respect to nuclear weapons and the nuclear weapons complex, which will have an impact for many years to come.

Today we stand at something of a crossroad. The Strategic Arms Reduction Treaty, the last nuclear weapons treaty between the United States and the Soviet Union, now Russia, will expire in 2009, unless both sides agree to extend all or part of that treaty. It has been more than 15 years since the end of the Cold War, and the executive branch for the first time since then is proposing to begin a new nuclear warhead program, and to consolidate and modernize the nuclear weapons complex.

It is time to start afresh and ask what are nuclear weapons for and how many is enough?

Senator BILL NELSON. Senator Sessions, any opening comments?

STATEMENT OF SENATOR JEFF SESSIONS

Senator SESSIONS. Thank you, Mr. Chairman.

I do think you're correct. I do believe that we're in a different strategic situation than we were during the Cold War, and we're making some decisions—some of those are being executed today—about our capacity and strategic weaponry. So, we need to continue to work on that.

We used to think of strategic weapons as silo-based missiles, submarines, and B–52 bombers, and the nuclear weapons they contained. Today, those strategic forces must not only be thought of as nuclear in capability, I believe, but as a broad array of capabilities intended to deal with today's new threats, which tend to be unpredictable, politically undeterrable, sometimes, and extremely violent.

The 2001 Nuclear Posture Review (NPR) established a conceptual framework for today's strategic posture. That new posture is predicated on the belief that deterrence concepts and force structure of the Cold War must now be tailored to fit the reality of today's strategic environment.

While the NPR recognized that our new relationship with the former Soviet Union made possible a significant reduction in the size of our nuclear arsenal, it also pointed out the need to bolster our strategic capabilities by adding conventional strike forces, missile defenses, and responsive nuclear infrastructure.

So, I would just conclude and note that, by the time we achieve compliance with our Moscow Treaty obligations in 2012, we will have the smallest nuclear stockpile we've had since the Eisenhower administration. I'll be interested to learn from our witnesses whether or not they believe our current strategic posture of reducing weapons has caused aggressive states to reduce or delay implementing their own nuclear program, and how the reality is perceived out there, how the world is actually acting, in a real way, to our actions.

So, Mr. Chairman, this is a time for a good, thoughtful discussion. We have a good panel, and I look forward to it.

[The prepared statement of Senator Sessions follows:]

PREPARED STATEMENT OF SENATOR JEFF SESSIONS

We meet today to receive testimony from Dr. Keith Payne. Dr. Sidney Drell, and Ambassador Robert Gallucci on the future of United States Strategic Policy. During the Cold War, the term "strategic forces" almost always meant silo-based intercontinental ballistic missiles, submarine-launched ballistic missiles, and long-range B–52 bombers—all armed with nuclear weapons. The purpose of these forces was to help contain the Soviet Union and Warsaw Pact and, ultimately, to deter Soviet nuclear weapons use against the United States and its allies.

Today, however, strategic forces must no longer be thought of only as nuclear deterrents, but as a broad array of capabilities intended to deal with today's new threats—which tend to be unpredictable, potentially undeterable, and extremely violent. If the Soviet Union and Warsaw Pact threat helped define both the mission and the force structure of our Cold War strategic capabilities, what are the central new threats to the United States and its allies that should help guide today's strategic forces? It's a reasonable question to ask, because without a clear understanding of the nature of the strategic threats we face, we risk sustaining or building strategic capabilities that will not serve us well, if at all.

NEW STRATEGIC THREATS

Arguably, the preeminent threat today is terrorism—fostered by violent Islamic radicalism—followed closely by the ongoing development of dangerous weapons and delivery systems by states that either support this ideological movement or believe they can benefit from the disruption to regional or global stability caused by these extremists. These new, unprecedented threats to the United States are further complicated by the concern that we are just not certain whether traditional deterrence strategies will work against these potential enemies. Will the threat of punishment make a terrorist think twice? Can we stop a rogue state from blackmailing us if they are, ultimately, able to strike us—or our allies—with nuclear weapons? The point is, we need to plan as if deterrence will not work, and therefore acquire strategic capabilities able to eliminate these threats before they can be used against us—or defend against those threats should deterrence fail.

This was the logic of the Bush administration's 2001 Nuclear Posture Review (NPR) which, while recognizing that nuclear forces remain a bedrock of our deterrence capabilities, emphasized the importance of improving our ability to counter post-Cold War threats by, among other things, adding conventional strike capabilities and missile defense to our arsenal of "strategic capabilities." The NPR also mandated significant reductions in the level of U.S. nuclear warheads down to 1,700–2,200. By the time we achieve compliance with our Moscow Treaty obligations in 2012, we will have the smallest nuclear stockpile we have had since the Eisenhower administration.

PROMPT CONVENTIONAL LONG-RANGE STRIKE

The ability to hold at risk high value targets in the war against terrorism, weapons of mass destruction caches, and mobile ballistic missile launchers is a capability any commander in chief should want to have in this day and age. We might be able to interdict these types of threats with covert operatives, strike aircraft, or cruise missiles, but this assumes we have the necessary forces in place and that they can reach the target in time. What if this were not the case, or the target was heavily defended? Wouldn't we want the capability to strike this target from afar using a non-nuclear weapon that would reach the target in hours, rather than days? Long-range prompt conventional strike capabilities also could be used early in a crisis or conflict to deter aggression, or stop aggressors in their tracks until other forces can be brought to bear. Non-nuclear strategic forces could be particularly useful for demonstrating U.S. and allied resolve during a crisis, and thereby act as a deterrent to further escalation.

BALLISTIC MISSILE DEFENSE

Recent ballistic missile testing by North Korea and Iran, coupled with the use of over 4,000 short-range rockets by Hezbollah against Israel, suggests that unfriendly regimes continue to view ballistic missiles, and their shorter-range variants, as a means to off-set the conventional superiority of adversaries—making them potential weapons of influence, blackmail, and terror.

The U.S. ballistic missile defense program is designed to thwart this potential terror weapon, and thereby strengthen U.S. diplomatic and deterrence options for dealing with these new threats to our security. Over the past 12 months, the United States has demonstrated through realistic testing the ability to shoot down short-, medium-, and long-range ballistic missiles using interceptors based on land and at sea, to include a September 8, 2006, intercept of a long-range ballistic missile warhead by the ground-based midcourse defense system. These new missile defense capabilities now contribute to the mix of policy options available to the President in his conduct of foreign policy.

This is why U.S. plans to deploy a ground-based midcourse defense (GMD) site in Europe are so important. By providing protection for NATO nations on both sides of the Atlantic against long-range ballistic missiles, plans for a GMD site in Europe support NATO's ongoing diplomatic efforts to end Iran's nuclear weapons program. Should Iran nevertheless develop the capability to place nuclear weapons on its ballistic missiles, NATO will be glad it has in place another means for deterring this potential threat—and to defend against it should deterrence fail.

NUCLEAR WEAPONS

While we address these emerging threats and develop capabilities in response, we continue to maintain our current nuclear weapons. Unfortunately, it has become apparent that this work is carried out in a nuclear weapons complex that is neither responsive in its capabilities, nor sized appropriately. As we develop, and fund at significant expense, the scientific tools to understand and certify the safety and reliability of our legacy weapons in the absence of nuclear testing, the Nuclear Weapons Council is examining whether limits may exist in our ability to extend perpetually the life of current warheads.

Earlier this month, the Council approved a design for a joint program between the Department of Energy and the U.S. Navy to provide a replacement warhead for a portion of the Nation's sea-based nuclear weapons. Although this announcement does not represent a decision to deploy a replacement warhead, it does mean that the military and scientific experts charged with the stewardship of our nuclear weapons are now evaluating whether our current path is sustainable over the long-term.

The Department of Energy is also evaluating options for the future of the nuclear weapons infrastructure through its Complex 2030 Environmental Impact Statement. The objective of Complex 2030 is a nuclear weapons complex that is sized appropriately for the smaller stockpile of the future and that has the capabilities to support that stockpile. The evaluation is still in its early stages, but I am concerned that the options being evaluated will modernize the complex we have now. I am not yet convinced that the Department of Energy is genuinely considering the realignment, consolidation, or closure of facilities that are excess to mission need. I will be pursuing this issue in other hearings the subcommittee will hold this spring.

CONCLUSION

In closing, I might note that during the Cold War, we built strategic nuclear forces that we hoped would never be used—because if they were to be used, we risked unimaginable destruction. Today, however, while we must maintain nuclear strategic forces that contribute to deterrence on a daily basis through the fact of their existence, we must also build non-nuclear strategic forces that we surely intend to use, because if we don't use them, it might mean that an adversary could inflict upon us blows of unimaginable consequences—perhaps far worse than the events of September 11.

I look forward to hearing the views of our witnesses on these and other important strategic forces issues.

Senator BILL NELSON. Okay. I would say to my colleagues, I'm going to defer my questions until the end, so that you all can have a chance to have your questions.

Dr. Drell, why don't you start first, and then Dr. Payne and Dean Gallucci.

Dr. Drell?

STATEMENT OF SIDNEY D. DRELL, SENIOR FELLOW, HOOVER INSTITUTION, PROFESSOR EMERITUS, STANFORD LINEAR ACCELERATOR CENTER, STANFORD UNIVERSITY

Dr. DRELL. Thank you, Mr. Chairman and Senators, for the opportunity to be here.

We are here, in my mind, at a dangerous time. I view us on the precipice of entering a new and more dangerous nuclear era, with the spread of technology, which means that, in particular, the enrichment of uranium, which makes it possible for more societies to enter the nuclear club and that raises a danger of nuclear weapons getting in the hands of terrorist groups, others unrestrained by the norms of civilized behavior, as we know it; and, therefore, these weapons become more likely to be used.

I think that, in these circumstances, reliance on nuclear weapons for deterrence—which was so essential during the Cold War—is becoming increasingly hazardous and decreasingly effective as the prospect of proliferation of nuclear weapons grows increasingly ominous.

In terms of the size of the stockpile, we still have, as a result of the START, although the Cold War has ended, something like 5,000 nuclear warheads in each of our arsenals, the United States and Russia, with approximately—close to, anyway—2,000 on ballistic missiles, many on prompt-launch procedures, which present risks of accidental or unauthorized launch. Why we're retaining such a force of that type is not clear to me.

I see this situation as presenting us with two major challenges. The first one is the immediate one, to develop a strategy to try and head off the loss of the nonproliferation regime, and to save the Nonproliferation Treaty (NPT). The longer-term one is perhaps fanciful, but, I believe, important, and that is to try to rekindle the vision, the bold vision, of Ronald Reagan and Mikhail Gorbachev when they came to their remarkable summit at Reykjavik in 1986 to seek to rid the world of nuclear weapons and to escape from the nuclear deterrence trap. As far as the immediate problem, and preserving the NPT in force since 1970, this requires supplementing that treaty with intrusive inspection measures so that we can make sure of compliance with its provisions.

Important agreements have been reached in this regard, and we're trying to bring into practice things like the additional protocols and the Proliferation Security Initiative to monitor these kinds of actions. I think it's also true to say that the nuclear weapons states, as we seek these more intrusive measures, have to be careful to offer incentives and to show restraints in our own programs to the non-nuclear countries with whom we need to cooperate in order to have an effective inspection regime and enforcement of the NPT.

Now, to my view, the two recent proposals by the United States to build new nuclear weapons were not wise. They were reviewed, globally, as counter to the efforts to strengthen the nonproliferation regime. I'm talking about the proposed high-yield bunker-buster for destroying deeply buried, hardened, underground targets. The second was the so-called very low-yield new-concept weapon to destroy deadly biological and chemical agents in shallow underground bunkers without dispersing their deadly effect. Fortunately, from my point of view, both proposals were rejected by Congress after careful independent analyses showed that their potential military value was quite limited, and marginal, in fact, and less compelling than the likely harmful effect that those new programs would have on the nonproliferation regime and our overall security thereby.

You are now debating, as you mentioned in your opening remark, the Reliable Replacement Warhead (RRW) Program designed to transform our aging nuclear complex, and also some of the weapons themselves in the current stockpile. There is, in my mind, a need to modernize parts of the complex that date back to World War II, for reasons of safety, efficiency, and flexibility. As long as the United States has nuclear weapons, which is likely to be for some time, we do need to be able to maintain them in our shrinking stockpile, to be safe and reliable. However, a clear decision on our long-term nuclear policy, which you alluded to our needing, is needed in order to decide the appropriate size and scope of that new complex. I think this does call for a fresh look at the role of nuclear weapons in our defense planning, and similarly for the Russians. We are the two countries with more than 90 percent of the nuclear weapons in the world. We are formally, now, declared to be allies against terrorism, the new threat we both face, and not adversaries, as we were in the Cold War.

On this point of a new look, former Ambassador James Goodby and I analyzed this question of, "what are nuclear weapons for?" in a report of that same title, which I have submitted for the record of these hearings. We considered present and prospective threats, and concluded that the strategic arsenal required by the United States can be reduced considerably to smaller numbers, carefully assuming that the Russians come down in a similar way that we do. In fact, as a first step, we recommended reducing our force structure to 500 operationally-deployed nuclear warheads, plus 500 in a responsive force. I can go into the details of that in the conversation. But this is a cooperative venture on both sides.

Turning to the other part of the RRW, and that is the transformation of the weapons, the stated goal of RRW is to increase confidence in their long-term reliability, safety, and use control—that's very important—and to do that without requiring underground explosive tests. That's the legislation. This presents, to my mind, a daunting technical challenge, to determine whether design changes or modifications to meet those ambitious goals can be certified and deployed without underground explosive testing. I believe that, at present, we do not know the answer to that question, but I do believe it is a worthwhile question to try to answer.

I think a sensible approach to it would have three elements:

The first one is to proceed carefully with research on proposed changes, subject to independent outside scrutiny, to determine whether it is possible to build a strong consensus and confidence that the proposed changes are mutually compatible and have the appropriate pedigree from our past test program. It is not a question of changing an individual component that'll work. It is a question of putting together a complicated system, and having system reliability.

The second point, I would say, is to recognize there is no time-pressing urgency in implementing the changes. The legacy stockpile is strong and reliable, in my judgment. The pace of the work on RRW should not consume human and budgetary resources to the extent of savaging the important ongoing, highly successful stockpile stewardship and life- extension program.

The third point is to recognize the importance of being clear about the limited goal of what we intend to do with the RRW Program, so as to avoid potentially harmful impact on our nonproliferation goals.

We have to recognize that many non-nuclear weapon states, whose cooperation we require, remain concerned about the seriousness of the commitment of nuclear powers to limit their nuclear efforts, and they are restive under the discriminatory features of the treaty.

Let me just very briefly close with a remark about—with the second challenge, or opportunity, that I mentioned, and that is to rekindle the bold vision that President Reagan and General Secretary Gorbachev brought to Reykjavik in 1986 to rid the world of nuclear weapons and escape the deterrence trap. They came close, with that summit, but they failed. However, they did succeed in turning the arms race on its head at Reykjavik. They initiated steps leading to significant reductions in deployed long- and intermediate-range nuclear forces, including the removal of an entire category, the intermediate nuclear forces, from Europe. To mark that event, former Secretary of State George Shultz, who was with President Reagan at Reykjavik, and I organized a conference at Stanford's Hoover Institution on the 20th anniversary, last October, and we reviewed the impact of Reykjavik and its relevance for today's world. We came out with a list of 10 steps, which we thought were practical, to define a path for accomplishing progress toward that goal, steps which, in and of themselves, will help reduce the nuclear danger. Those steps appear in the Wall Street Journal piece published January 4, with four headline signatories: Secretary Shultz, former Secretary of State Henry Kissinger, former Defense Secretary William Perry, and former chairman of this committee, Sam Nunn. I've introduced that for the record.

[The information referred to follows:]

A World Free of Nuclear Weapons

1/4/2007

By George P. Shultz, William J. Perry, Henry A. Kissinger and Sam Nunn.

The Wall Street Journal
January 4, 2007; Page A15

Nuclear weapons today present tremendous dangers, but also an historic opportunity. U.S. leadership will be required to take the world to the next stage -- to a solid consensus for reversing reliance on nuclear weapons globally as a vital contribution to preventing their proliferation into potentially dangerous hands, and ultimately ending them as a threat to the world.

Nuclear weapons were essential to maintaining international security during the Cold War because they were a means of deterrence. The end of the Cold War made the doctrine of mutual Soviet-American deterrence obsolete. Deterrence continues to be a relevant consideration for many states with regard to threats from other states. But reliance on nuclear weapons for this purpose is becoming increasingly hazardous and decreasingly effective.

North Korea's recent nuclear test and Iran's refusal to stop its program to enrich uranium -- potentially to weapons grade -- highlight the fact that the world is now on the precipice of a new and dangerous nuclear era. Most alarmingly, the likelihood that non-state terrorists will get their hands on nuclear weaponry is increasing. In today's war waged on world order by terrorists, nuclear weapons are the ultimate means of mass devastation. And non-state terrorist groups with nuclear weapons are conceptually outside the bounds of a deterrent strategy and present difficult new security challenges.

Apart from the terrorist threat, unless urgent new actions are taken, the U.S. soon will be compelled to enter a new nuclear era that will be more precarious, psychologically disorienting, and economically even more costly than was Cold War deterrence. It is far from certain that we can successfully replicate the old Soviet-American "mutually assured destruction" with an increasing number of potential nuclear enemies world-wide without dramatically increasing the risk that nuclear weapons will be used. New nuclear states do not have the benefit of years of step-by-step safeguards put in effect during the Cold War to prevent nuclear accidents, misjudgments or unauthorized launches. The United States and the Soviet Union learned from mistakes that were less than fatal. Both countries were diligent to ensure that no nuclear weapon was used during the Cold War by design or by accident. Will new nuclear nations and the world be as fortunate in the next 50 years as we were during the Cold War?

* * *

Leaders addressed this issue in earlier times. In his "Atoms for Peace" address to the United Nations in 1953, Dwight D. Eisenhower pledged America's "determination to help solve the fearful atomic dilemma -- to devote its entire heart and mind to find the way by which the miraculous inventiveness of man shall not be dedicated to his death, but consecrated to his life." John F. Kennedy, seeking to break the logjam on nuclear disarmament, said, "The world was not meant to be a prison in which man awaits his execution."

Rajiv Gandhi, addressing the U.N. General Assembly on June 9, 1988, appealed, "Nuclear war will not mean the death of a hundred million people. Or even a thousand million. It will mean the extinction of four thousand million: the end of life as we know it on our planet earth. We come to the United Nations to seek your support. We seek your support to put a stop to this madness."

Ronald Reagan called for the abolishment of "all nuclear weapons," which he considered to be "totally irrational, totally inhumane, good for nothing but killing, possibly destructive of life on earth and civilization." Mikhail Gorbachev shared this vision, which had also been expressed by previous American presidents.

Although Reagan and Mr. Gorbachev failed at Reykjavik to achieve the goal of an agreement to get rid of all nuclear weapons, they did succeed in turning the arms race on its head. They initiated steps leading to significant reductions in deployed long- and intermediate-range nuclear forces, including the elimination of an entire class of threatening missiles.

What will it take to rekindle the vision shared by Reagan and Mr. Gorbachev? Can a world-wide consensus be forged that defines a series of practical steps leading to major reductions in the nuclear danger? There is an urgent need to address the challenge posed by these two questions.

The Non-Proliferation Treaty (NPT) envisioned the end of all nuclear weapons. It provides (a) that states that did not possess nuclear weapons as of 1967 agree not to obtain them, and (b) that states that do possess them agree to divest themselves of these weapons over time. Every president of both parties since Richard Nixon has reaffirmed these treaty obligations, but non-nuclear weapon states have grown increasingly skeptical of the sincerity of the nuclear powers.

Strong non-proliferation efforts are under way. The Cooperative Threat Reduction program, the Global Threat Reduction Initiative, the Proliferation Security Initiative and the Additional Protocols are innovative approaches that provide powerful new tools for detecting activities that violate the NPT and endanger world security. They deserve full implementation. The negotiations on proliferation of nuclear weapons by North Korea and Iran, involving all the permanent members of the Security Council plus Germany and Japan, are crucially important. They must be energetically pursued.

But by themselves, none of these steps are adequate to the danger. Reagan and General Secretary Gorbachev aspired to accomplish more at their meeting in Reykjavik 20 years ago -- the elimination of nuclear weapons altogether. Their vision shocked experts in the doctrine of nuclear deterrence, but galvanized the hopes of people around the world. The leaders of the two countries with the largest arsenals of nuclear weapons discussed the abolition of their most powerful weapons.

* * *

What should be done? Can the promise of the NPT and the possibilities envisioned at Reykjavik be brought to fruition? We believe that a major effort should be launched by the United States to produce a positive answer through concrete stages.

First and foremost is intensive work with leaders of the countries in possession of nuclear weapons to turn the goal of a world without nuclear weapons into a joint enterprise. Such a joint enterprise, by involving changes in the disposition of the states possessing nuclear weapons, would lend additional weight to efforts already under way to avoid the emergence of a nuclear-armed North Korea and Iran.

The program on which agreements should be sought would constitute a series of agreed and urgent steps that would lay the groundwork for a world free of the nuclear threat. Steps would include:

- Changing the Cold War posture of deployed nuclear weapons to increase warning time and thereby reduce the danger of an accidental or unauthorized use of a nuclear weapon.

- Continuing to reduce substantially the size of nuclear forces in all states that possess them.

- Eliminating short-range nuclear weapons designed to be forward-deployed.

- Initiating a bipartisan process with the Senate, including understandings to increase confidence and provide for periodic review, to achieve ratification of the Comprehensive Test Ban Treaty, taking advantage of recent technical advances, and working to secure ratification by other key states.

- Providing the highest possible standards of security for all stocks of weapons, weapons-usable plutonium, and highly enriched uranium everywhere in the world.

- Getting control of the uranium enrichment process, combined with the guarantee that uranium for nuclear power reactors could be obtained at a reasonable price, first from the Nuclear Suppliers Group and then from the International Atomic Energy Agency (IAEA) or other controlled international reserves. It will also be necessary to deal with proliferation issues presented by spent fuel from reactors producing electricity.

- Halting the production of fissile material for weapons globally; phasing out the use of highly enriched uranium in civil commerce and removing weapons-usable uranium from research facilities around the world and rendering the materials safe.

- Redoubling our efforts to resolve regional confrontations and conflicts that give rise to new nuclear powers.

Achieving the goal of a world free of nuclear weapons will also require effective measures to impede or counter any nuclear-related conduct that is potentially threatening to the security of any state or peoples.

Reassertion of the vision of a world free of nuclear weapons and practical measures toward achieving that goal would be, and would be perceived as, a bold initiative consistent with America's moral heritage. The effort could have a profoundly positive impact on the security of future generations. Without the bold vision, the actions will not be perceived as fair or urgent. Without the actions, the vision will not be perceived as realistic or possible.

We endorse setting the goal of a world free of nuclear weapons and working energetically on the actions required to achieve that goal, beginning with the measures outlined above.

Mr. Shultz, a distinguished fellow at the Hoover Institution at Stanford, was secretary of state from 1982 to 1989. Mr. Perry was secretary of defense from 1994 to 1997. Mr. Kissinger, chairman of Kissinger Associates, was secretary of state from 1973 to 1977. Mr. Nunn is former chairman of the Senate Armed Services Committee.

A conference organized by Mr. Shultz and Sidney D. Drell was held at Hoover to reconsider the vision that Reagan and Mr. Gorbachev brought to Reykjavik. In addition to Messrs. Shultz and Drell, the following participants also endorse the view in this statement: Martin Anderson, Steve Andreasen, Michael Armacost, William Crowe, James Goodby, Thomas Graham Jr., Thomas Henriksen, David Holloway, Max Kampelman, Jack Matlock, John McLaughlin, Don Oberdorfer, Rozanne Ridgway, Henry Rowen, Roald Sagdeev and Abraham Sofaer.

Dr. DRELL. Let me end my short time by saying, I think that intensive work with leaders of other countries with nuclear weapons to make this a joint venture would be an important step forward. The steps themselves, you can read about or we can discuss. Let me end just by saying that the advantage of having that vision, reasserting a vision of a world free of nuclear weapons; and taking practical measures toward achieving the goal, could have, I believe, a profound positive impact on the security of future generations. Without that bold vision, the actions that we recommend, and the steps that one takes to reduce nuclear danger, will not be perceived as fair or urgent; they will still be viewed as retaining the discriminatory nature of the nuclear world as it is now. Also, without the vision, the actions will not actually be very practically achieved in any timeframe.

So, thank you for allowing me to express my views.

[The prepared statement of Dr. Drell follows:]

PREPARED STATEMENT BY DR. SIDNEY D. DRELL

The existing international regime, grounded in the nuclear Nonproliferation Treaty (NPT) for preventing new nuclear weapon states, reducing existing nuclear arsenals, and controlling the spread of nuclear technology and material, is seriously endangered.

The spread of technology, particularly uranium enrichment and plutonium reprocessing technology for civilian energy, creates the danger of more states with nuclear arms and fissile material. In turn, it provides more opportunities for theft or sale to terrorist groups or other societal units unrestrained by accepted norms of civilized behavior, thereby increasing the risk that nuclear weapons will be used.

Beyond North Korea and Iran more than 40 nations already have taken substantial steps forward in nuclear technology. Even more have indicated interest in developing such technology for civilian power. Once you can enrich uranium for a civilian power reactor—you are well on the way. Without a change of course, the United States and the world soon will be compelled to enter a new nuclear era that will be more precarious and economically costly than was Cold War deterrence.

During the Cold War, nuclear weapons were essential to maintaining international security because they were a means of deterrence. Sixteen years ago the Cold War ended with the demise of the Soviet Union, and with it, the doctrine of mutual Soviet-American deterrence became obsolete. Deterrence continues to be a relevant consideration for many states with regard to threats from other states. But reliance on nuclear weapons for this purpose is becoming increasingly hazardous and decreasingly effective as the prospect of nuclear proliferation grows increasingly ominous.

Nevertheless U.S. and Russian nuclear stockpiles remain bloated. In 2012, more than 20 years after the collapse of the Soviet Union, the United States and Russia, each, will still have approximately 5,000 nuclear bombs and warheads in their arsenals, close to two thousand of which will be deployed on ballistic missiles, many on prompt launch procedures presenting unnecessary risks of an accidental or unauthorized launch. Why are we still retaining such large nuclear arsenals as a legacy of the Cold War? What are these weapons for?

This situation presents us with two major challenges—and opportunities. The first is to develop a strategy for dealing with the world as it is today, starting with steps to prevent the further spread of nuclear weapons. The second is to rekindle the bold vision that President Reagan and General Secretary Gorbachev brought to their remarkable summit at Reykjavik in 1986: ridding the world of nuclear weapons and escaping from the nuclear deterrence trap. Although they failed in the end, they did succeed in turning the arms race on its head. They initiated steps leading to significant reductions in deployed long- and intermediate-range nuclear forces, including the elimination of an entire class of threatening missiles—the INF missiles in Europe.

Can we rekindle their vision? Can we escape from the nuclear deterrence trap before it is too late?

To face the first challenge, and deal with the world as is, we must save and strengthen the nonproliferation regime based on the NPT of 1970. In view of the continuing spread of nuclear weapons technology, the NPT will need to be supplemented with intrusive new inspection rights for monitoring compliance with its provisions and detecting covert efforts by a would-be proliferator to evade them. Important agreements have already been reached to bring such provisions into practice.

It is not necessary to look abroad for challenges to the present nonproliferation regime. Nonnuclear weapon states repeatedly emphasize their concerns about the ongoing weapons programs of the nuclear powers. We are urged to honor the NPT by formalizing the current moratorium on underground bomb testing into a Comprehensive Test Ban Treaty (CTBT); reducing our reliance on nuclear weapons; and substantially decreasing their numbers more rapidly. Recent efforts by Washington to build two new nuclear warheads for new military missions were viewed widely as counter to global efforts to strengthen the nonproliferation regime. One new warhead was a high-yield bunker buster for destroying deeply buried, hardened underground targets, and the second was a very low yield “new concept” weapon to destroy deadly biological and chemical agents stored in shallow underground bunkers without dispersing them. Fortunately both proposals were rejected after several years of debate in Congress. Rejection was based on a judgment that benefitted from careful independent technical analyses that concluded their potential military value was marginal and less compelling than their likely harmful impact on the nonproliferation regime and U.S. overall national security. It was also a ringing rejection of the dangerous idea of lowering the threshold for using nuclear weapons in limited military strikes.

Currently Congress is debating whether or how to proceed with a Reliable Replacement Warhead Program designed to transform both our aging nuclear infrastructure and the weapons in our current stockpile. There is a need to modernize parts of the complex that date back to World War II for reasons of safety, efficiency, and flexibility. As long as the United States has nuclear weapons, we need to be able to maintain the warheads in the shrinking stockpile to be safe and reliable. But a clear decision on our long-term nuclear policy goals is needed in order to decide on the appropriate size and scope of the new complex. This calls for a fresh look at the role of nuclear weapons in U.S. defense planning. The United States and

Russia have now officially adopted a policy of cooperation against the new threats, faced by both nations, of terrorists and unstable or irresponsible governments acquiring nuclear weapons. This replaces the former adversarial relationship of nuclear deterrence based on mutual based destruction. As stated in the Joint Declaration of Presidents Bush and Putin of November 13, 2001: "The United States and Russia have overcome the legacy of the Cold War. Neither country regards the other as an enemy or threat." What then are the anticipated missions and targets for the thousands of nuclear warheads remaining in their arsenals?

Ambassador James Goodby and I analyzed this question of "What Are Nuclear Weapons For" in today's world in a recent report[1] that I have submitted for the record. Based on our analysis of the present and prospective threats that define missions for U.S. nuclear weapons we conclude that the strategic arsenal required by the United States can be reduced to considerably lower numbers. We recommend as a first step reduction to a U.S. force structure of 500 operationally-deployed nuclear warheads, plus 500 in a responsive force. The United States and Russia should cooperate to achieve this in the coming decade, engaging the other nuclear powers for proportionate reductions.

As to the transformation of the weapons with the stated goal to increase confidence in their long-term reliability, safety, and use control, we still face a daunting technical challenge to determine whether new designs to meet those ambitious goals can be certified and deployed without underground explosive testing. I don't believe that, at present, we know the answer to that question. But I do believe it is worthwhile to try to answer. A sensible approach to it should:

1. Proceed carefully with research on modifications or a new design that meet the stated requirements, before moving ahead to development and manufacture. Necessary are detailed analyses subject to fully independent scrutiny to determine whether it is possible to gain confidence and build a strong consensus that the proposed changes are mutually compatible and have the appropriate test pedigree from our previous work. It is not a question of the individual components working, but of the system—in fact a system of systems—being reliable.
2. Recognize that there is no pressing urgency in implementing changes—the legacy stockpile is strong—the pace of the work should not consume human and budgetary resources to the extent of savaging the important ongoing and highly successful Stockpile Stewardship and Life Extension Program.
3. Recognize the importance of being clear about the limited goals of what we are doing so as to avoid potentially harmful impacts on the nonproliferation goals of this country and beyond, globally. Concerns by the many nonnuclear weapon states, whose cooperation we require, about the seriousness of the commitment of the nuclear powers to limit their nuclear efforts in accord with the NPT cannot be ignored, denied, or dismissed as irrelevant. They registered such concerns strongly in negotiations at the U.N. on continuing the NPT into the indefinite future, and called on the nuclear powers to restrain their nuclear programs and ratify a CTBT.

An important action to address these concerns would be a commitment by the United States to face the second challenge: to rekindle the vision of Reykjavik and develop a strategy to achieve it. This was addressed at a conference that George Shultz, who participated at Reykjavik as President Reagan's Secretary of State, and I organized at Stanford University's Hoover Institution this past October marking the 20th anniversary of that remarkable summit. Ever since Hiroshima at the dawn of the nuclear era a number of studies and conferences have addressed the challenge of ridding the world of nuclear weapons. Renewed interest in achieving this goal has been generated by the realization that the world is approaching the precipice of the new and even more dangerous nuclear era with the spread of nuclear technology that is threatening the nonproliferation regime. Moreover at present we lack a global strategy and vision commensurate with the tremendous dangers ahead.

At the Stanford/Hoover Conference we reviewed the impact of Reykjavik and its relevance for today's world. We formulated what we considered a set of practical steps to define a path for accomplishing the goal of ridding the world of nuclear weapons. Our conclusions and recommendations were summarized in a recent article that appeared in the Wall Street Journal[2] on January 4, 2007.

First and foremost, intensive work with leaders of the countries in possession of nuclear weapons will be required to turn the goal of a world without nuclear weapons into a joint enterprise, and create a working mechanism for accomplishing this goal. Such a joint enterprise would lend additional weight to efforts already under way to avoid the emergence of a nuclear-armed North Korea and Iran.

---

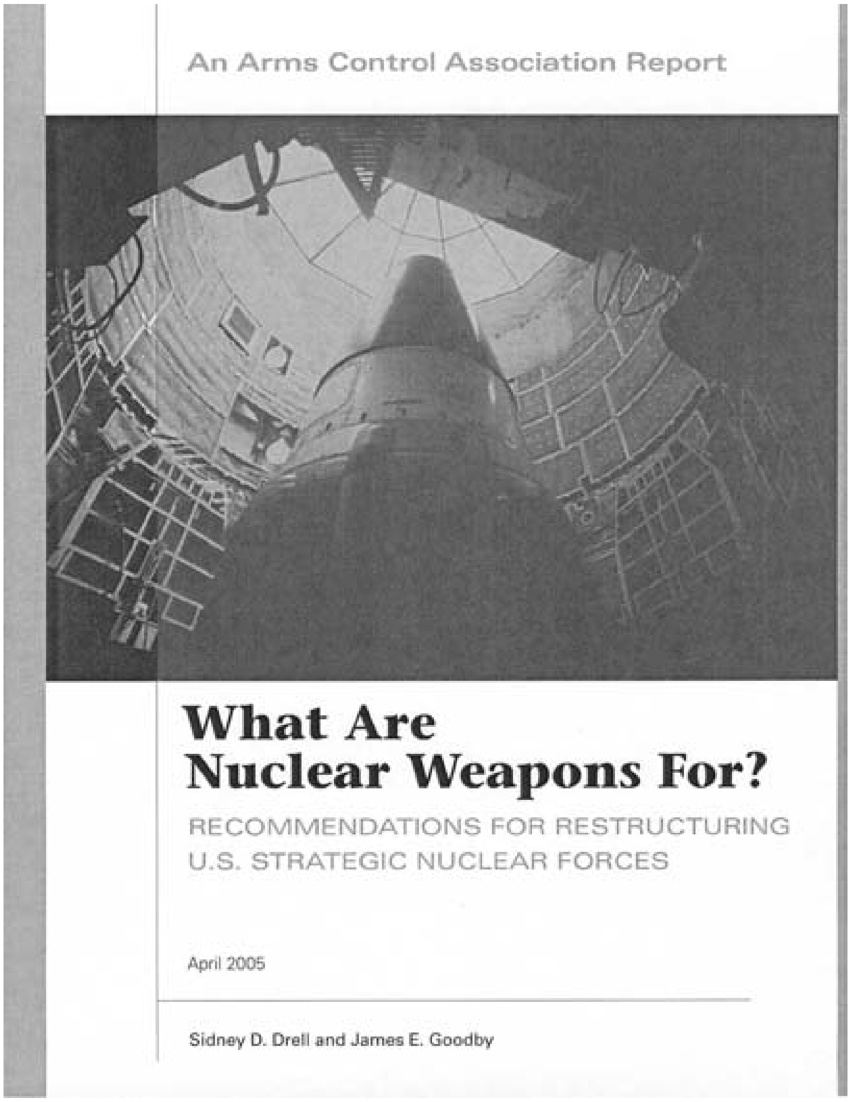
[1] S. Drell and J. Goodby: "What Are Nuclear Weapons For?" (Report for the Arms Control Association, April 2005). It is published on their website and reprinted in "Nuclear Weapons, Scientists, and the Post-Cold War Challenge" by S. Drell (World Scientific Press, Singapore, 2007).

[2] "A World Free of Nuclear Weapons" signed by George Shultz, William Perry, Henry Kissinger, and Sam Nunn, and endorsed by the conference participants who also signed on.

Specific actions were also proposed:

- Changing the Cold War posture of deployed nuclear weapons to increase warning time and thereby reduce the danger of an accidental or unauthorized use of a nuclear weapon.
- Continuing to reduce substantially the size of nuclear forces in all states that possess them.
- Eliminating short-range nuclear weapons designed to be forward-deployed.
- Initiating a bipartisan process with the Senate, including understandings to increase confidence and provide for periodic review, to achieve ratification of the CTBT, taking advantage of recent technical advances, and working to secure ratification by other key states.
- Providing the highest possible standards of security for all stocks of weapons, weapons-usable plutonium, and highly-enriched uranium everywhere in the world.
- Getting control of the uranium enrichment process, combined with the guarantee that uranium for nuclear power reactors could be obtained at a reasonable price, first from the Nuclear Suppliers Group and then from the International Atomic Energy Agency or other controlled international reserves. It will also be necessary to deal with proliferation issues presented by spent fuel from reactors producing electricity.
- Halting the production of fissile material for weapons globally; phasing out the use of highly-enriched uranium in civil commerce and removing weapons-usable uranium from research facilities around the world and rendering the materials safe.
- Redoubling our efforts to resolve regional confrontations and conflicts that give rise to new nuclear powers.
- Addressing the requirements for effective measures to impede or counter any nuclear related conduct that is potentially threatening to the security of any state or peoples.

Reassertion of the vision of a world free of nuclear weapons and practical measures toward achieving that goal could have a profoundly positive impact on the security of future generations. Without the bold vision, the actions will not be perceived as fair or urgent. Without the actions, the vision will not be perceived as realistic or possible.



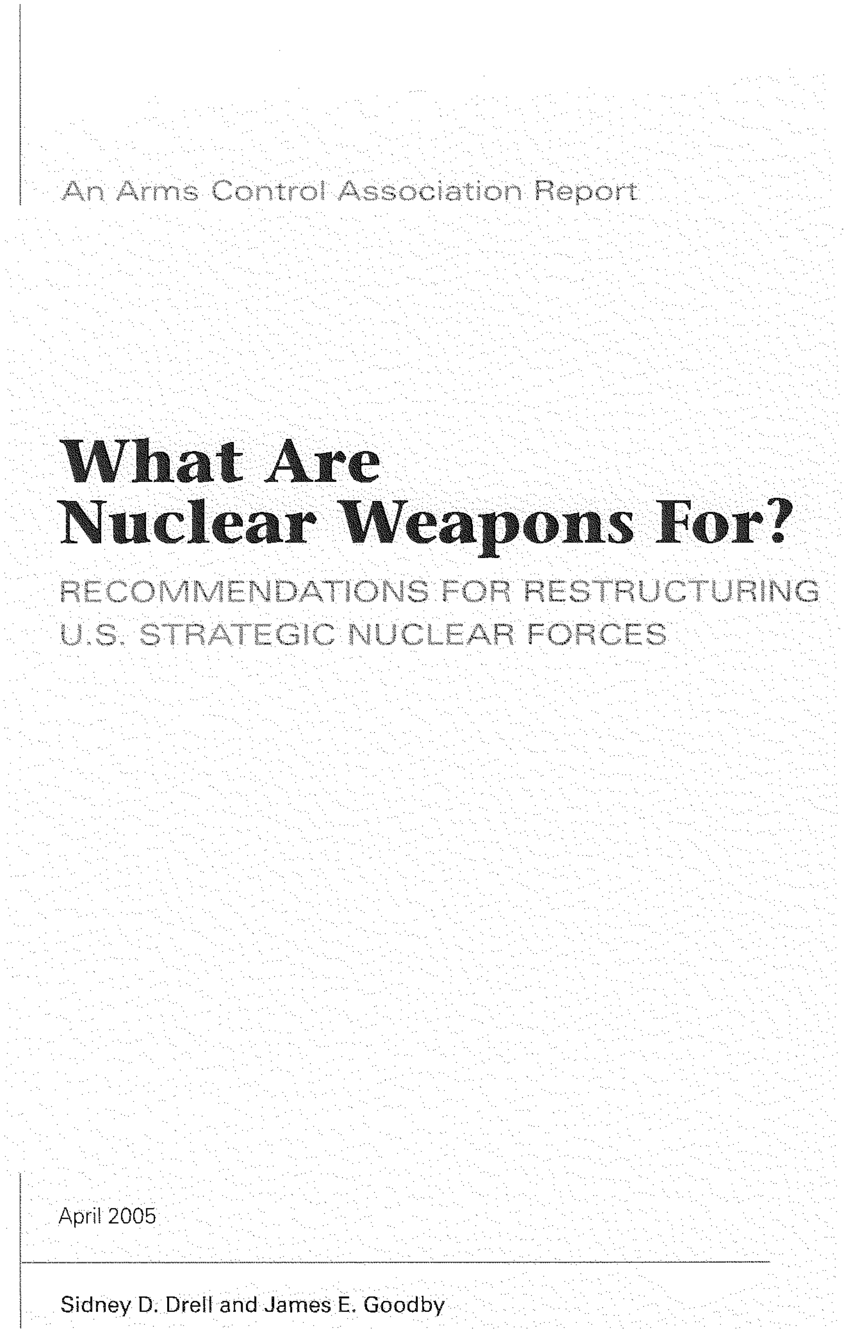
An Arms Control Association Report

What Are Nuclear Weapons For?

RECOMMENDATIONS FOR RESTRUCTURING U.S. STRATEGIC NUCLEAR FORCES

April 2005

Sidney D. Drell and James E. Goodby



An Arms Control Association Report

What Are Nuclear Weapons For?

RECOMMENDATIONS FOR RESTRUCTURING U.S. STRATEGIC NUCLEAR FORCES

April 2005

Sidney D. Drell and James E. Goodby

About the Authors

Sidney D. Drell is professor of physics emeritus at Stanford University's Linear Accelerator Center and a senior fellow at its Hoover Institution. For many years he has been an advisor to the U.S. government on technical issues relating to international security and arms control, including membership on the President's Foreign Intelligence Advisory Board and Science Advisory Committee. Honors recognizing his contributions to both physics and international security include the Enrico Fermi Medal, the National Intelligence Distinguished Service Medal, and election to the National Academy of Sciences.

Ambassador James E. Goodby is a Nonresident Senior Fellow at the Brookings Institution. He has held several senior government positions dedicated to arms control and nonproliferation, including Deputy to the Special Advisor to the President and Secretary of State on the Comprehensive Test Ban Treaty (CTBT) from 2000–2001, Special Representative of President Clinton for the security and dismantlement of nuclear weapons from 1995–1996, chief negotiator for nuclear threat reduction agreements from 1993–1994, and vice-chair of the U.S. delegation to the Strategic Arms Reduction Treaty talks from 1982–1983.

Drell and Goodby are co-authors of *The Gravest Danger: Nuclear Weapons*, Hoover Institution Press, 2003.

Acknowledgements

The authors extend thanks to Daryl Kimball and Wade Boese, who reviewed and commented on earlier drafts of the manuscript, and to the staff of the Arms Control Association and to Bonnie Rose who helped facilitate editing and production. Goodby extends his thanks to the Center for International Security and Cooperation at Stanford and the Woodrow Wilson International Center for Scholars for their assistance.

The authors and the Arms Control Association also acknowledge the generous support of the Ploughshares Fund, without which the time and resources necessary to write, produce, and distribute *What Are Nuclear Weapons For?* would not have been available. We are also grateful to Sally James of Cutting Edge Design for layout and design of the report, and to Brian Allen for his copyediting skills.

The report's content and recommendations are solely the responsibility of the authors and do not necessarily reflect the views of the staff, directors, or members of the Arms Control Association.

©Arms Control Association, April 2005.

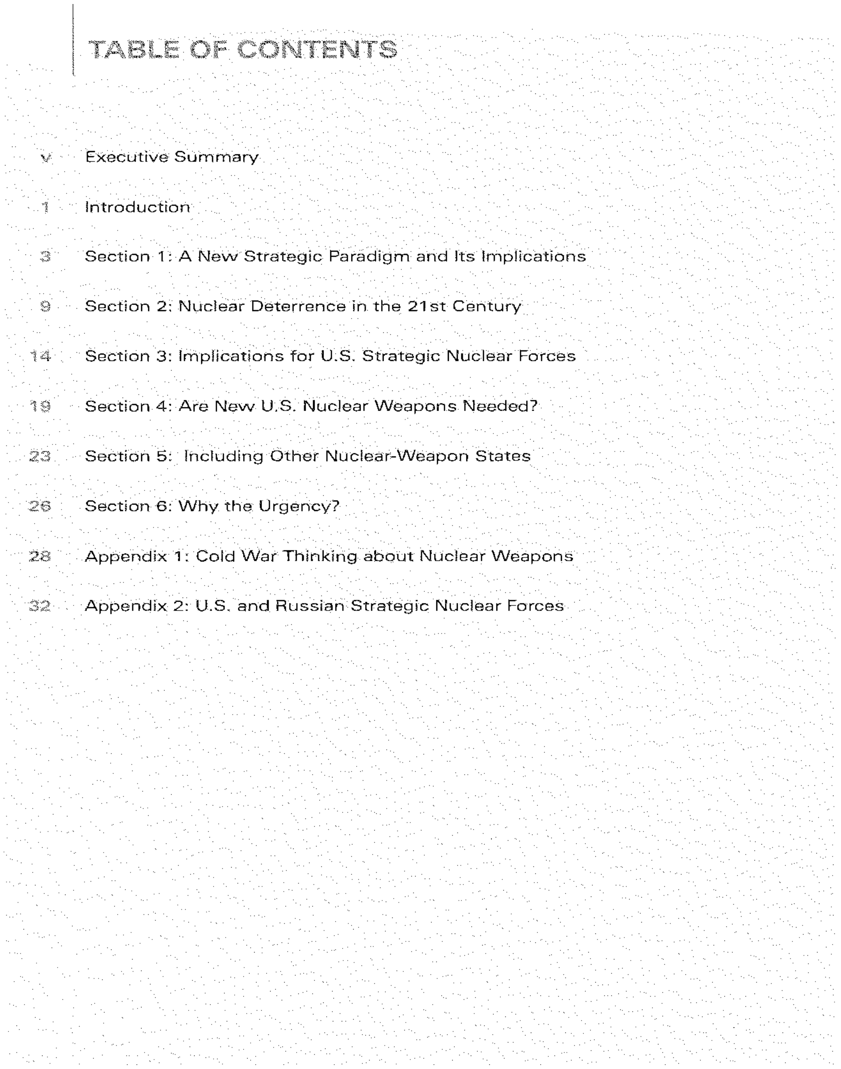


TABLE OF CONTENTS

v Executive Summary

1 Introduction

3 Section 1: A New Strategic Paradigm and Its Implications

9 Section 2: Nuclear Deterrence in the 21st Century

14 Section 3: Implications for U.S. Strategic Nuclear Forces

19 Section 4: Are New U.S. Nuclear Weapons Needed?

23 Section 5: Including Other Nuclear-Weapon States

26 Section 6: Why the Urgency?

28 Appendix 1: Cold War Thinking about Nuclear Weapons

32 Appendix 2: U.S. and Russian Strategic Nuclear Forces

Executive Summary

The role of nuclear weapons in U.S. defense planning needs a fresh look. The United States and Russia have now officially adopted a policy of cooperation against the new threats, faced by both nations, of terrorists and unstable or irresponsible governments acquiring nuclear weapons. This replaces the former adversarial relationship of nuclear deterrence based on mutual assured destruction. As stated in the Joint Declaration of Presidents Bush and Putin of November 13, 2001: "The United States and Russia have overcome the legacy of the Cold War. Neither country regards the other as an enemy or threat." What then are the anticipated missions and targets for the thousands of nuclear warheads remaining in their arsenals?

Based on an analysis of the present and prospective threats that define missions for U.S. nuclear weapons we conclude that the strategic arsenal required by the United States can be reduced to considerably lower numbers. We recommend a U.S. force structure of 500 operationally deployed nuclear warheads, plus 500 in a responsive force. The United States and Russia should cooperate to achieve this in the year 2010. We propose, as a specific suggestion for the individual components of a "500+500 in 2010" force for the United States, the following:

Operationally Deployed Force

- Three Trident submarines on station at sea, each loaded with 24 missiles and 96 warheads (a mix of low-yield W76s and high-yield W88s). Reducing the D5 missiles from their full complement of eight warheads to four per missile will substantially increase their maximum operating areas.
- 100 Minuteman III ICBMs in hardened silos, each with a single W87 warhead in a Mk 12a reentry vehicle.
- 20–25 B2 and B52H bombers configured for gravity bombs or air-launched cruise missiles.

Responsive Force

- Three Trident submarines, each loaded with 96 warheads, in transit or being replenished in port for their next missions as part of a Ready Responsive Force for a rapidly building crisis, plus two or three unarmed boats in overhaul.
- 50–100 additional Minuteman III missiles taken off alert and without warheads, and 20–25 bombers, unarmed, in maintenance and training, all of which would comprise a Strategic Responsive Force, for a more slowly building confrontation.

This force is composed of existing warheads and delivery systems and requires no new nuclear weapons. It retains the current diversity of systems as a hedge against common failure modes. We believe that, in time, nuclear deterrence might be maintained entirely with a responsive force, with the responsive force consisting of no more than the 500 warheads that are initially postulated for the operationally deployed force.

We find no need for designing new nuclear weapons against potential new threats, believing that those weapons which the United States has already developed to counter the Soviet Union will be sufficient for new threats. To the contrary, we do see important opportunities for the United States to seize that would improve its national security by strengthening the nonproliferation regime. To this end, timely initiatives by the nuclear-weapon states to significantly reduce their nuclear arsenals and to restrain the development of new nuclear weapons can play an important role by addressing increasingly voiced concerns of the non-nuclear-weapon nations about the discriminatory nature of the nuclear Nonproliferation Treaty.

INTRODUCTION

What Are Nuclear Weapons For?

The role of nuclear weapons in U.S. defense planning needs a fresh look. Although the U.S.-Soviet superpower competition that gave rise to the building and deployment of tens of thousands of nuclear weapons ended more than a decade ago, the thinking of that era dangerously persists. Yesterday's doctrines are no longer appropriate for today's realities. The traditional role of deterrence has diminished with Russia's ongoing transition from strategic foe to partner. The new threats faced by the international community do not present situations where the net effect of using nuclear weapons except in the most extreme circumstances would benefit U.S. interests. The U.S. nuclear weapons stockpile and attendant doctrines should be adjusted to minimize the salience of nuclear weapons and to ensure that they are truly weapons of last choice. Adopting such a posture would support the nation's highest national security priority: preventing the use of nuclear weapons and their proliferation to terrorists and to additional states.

Official U.S. thinking about nuclear weapons has changed many times during the 60 years since the first nuclear explosions in 1945. These changes reflected evolving assessments of what it would take to deter a well-armed adversary, the Soviet Union, from attacking the United States, its European allies, or its vital interests. In turn, the reassessments resulted in changes in strategic planning, targeting, and the types and numbers of weapons in the U.S. stockpile, all of which are interrelated. The clarity of the bipolar U.S.-Soviet world has given way to the ambiguities and uncertainties of a world where international security is threatened by transnational terrorists, unstable and failed states, and regimes that scorn a world order based on broadly accepted principles. The dangers inherent in such a stew are magnified by easier access to nuclear technology, inadequately protected stockpiles of plutonium and highly enriched uranium—the two key fissile materials needed to build nuclear weapons—the growing availability of missiles worldwide, black market nuclear supply networks, and a trend toward acquisition of "latent" nuclear weapons capabilities through the possession of the entire nuclear fuel cycle.

The history of the nuclear age shows that concepts of what it takes to have a sufficient nuclear weapons capability are far from immutable and that the unique character of nuclear weapons has become ingrained in the nuclear-age culture. A sense of doom persists even today, but in an attenuated form. The first atomic bombs dropped on Hiroshima and Nagasaki in August 1945 had a destructive energy 10,000 times larger than previous explosive devices. Within a decade, the United States and the Soviet Union designed and built thermonuclear bombs, the so-called hydrogen bombs, a thousand times more powerful than fission bombs. Fearful for the fate of civilization and of humanity itself, a shocked world asked why these terrible weapons existed. Under what circumstances and for what purpose could the use of the world's most destructive mass-terror weapons ever be justified? Could or would civilized people actually use them again, causing the indiscriminate deaths of innocent civilians on an unprecedented scale?

As nuclear arsenals grew larger and the "secret" technologies behind them became more widely available, a deeper understanding of the horrors of a nuclear conflict spread throughout the world. This awareness was sharpened by repeated tests of hydrogen bombs that could destroy all life and structures within a distance of approximately ten kilometers around a single bomb's detonation point. That scale of potential destruction was unprecedented in human history, and it became obvious that such weapons could not be treated simply as more effective and efficient tools for waging war. Instead, the value of such weapons began to be seen by U.S. political leaders almost from the outset as a means of deterring a Soviet attack on the United States or its allies. Soviet political leaders eventually accepted the same view, in reverse.

Perversely, the two adversaries' arsenals grew rapidly to senseless numbers in the name of deterrence, which was defined as requiring nuclear forces that could survive an adversary's all-out first strike and respond with an attack capable of delivering massive destruction on the initial attacker. Over time, the United States and the Soviet Union both expanded their forces to numbers exceeding tens of thousands of warheads on several thousand launchers capable of delivering several thousand megatons of destructive energy. This was done despite a greater understanding and fear of the devastating consequences of using nuclear explosives in combat, even at a much lower level. The evolution of the deterrence concept and the highlights of the nuclear age are discussed in Appendix 1.

The U.S. nuclear weapons stockpile and attendant doctrines should be adjusted to minimize the salience of nuclear weapons and to ensure that they are truly weapons of last choice.

Despite the excessive numbers, not because of them, policy choices of governments and a good measure of luck brought the world through the danger years without a nuclear conflict and with broad agreement on the need to limit the spread of materials and advanced technology necessary for building nuclear arsenals. The two superpower rivals averted a direct clash, in part because the existence of nuclear weapons had the effect of imposing prudence on a Cold War confrontation that had the potential for erupting into World War III. This prudential effect surely would have been achieved at far lower levels of nuclear stockpiles and could be achieved at far lower levels than currently planned by the United States for a wholly different era and set of security challenges.

A New Strategic Paradigm and Its Implications

The stage had been set for a fundamental transition in U.S.-Russian strategic nuclear relations as early as the end of the Reagan administration in 1988, but Presidents George H. W. Bush and Bill Clinton failed to fully realize the opportunity presented by the winding down and eventual end of the Cold War. Bush, Ronald Reagan's vice president and successor, chose to remain within the Cold War arms control paradigm of retaining nuclear forces sufficient to respond to an all-out Soviet nuclear attack by inflicting complete annihilation on that country, its military forces, and its people if necessary. Bush stayed with this inherited course partly because of his uncertainty about the irreversibility of political changes taking place in Russia. Still, he signed two major strategic nuclear arms reduction agreements, START I and START II, and initiated reciprocal U.S.-Soviet withdrawals of tactical, or "battlefield," nuclear weapons.

Clinton, who became president in 1993, made essentially the same decision to remain within the Cold War arms control paradigm, although his freedom of action during his last years in office was significantly constrained by a hostile Congress. Yet, he enlarged and modified the arms control agenda with his strong support for the Nunn-Lugar Cooperative Threat Reduction program to help Russia and other former Soviet states secure and dispose of their surplus nuclear forces and materials following the 1991 collapse of the Soviet Union. Although accomplishing much, more remains to be done in this area.

Clinton also sought to devise a framework for a START III to reduce U.S. and Russian nuclear forces dramatically. Russian President Boris Yeltsin accepted in principle the notion of a START III at a 1997 meeting in Helsinki, but Russia at the same time remained staunchly opposed to U.S. missile defense plans and any tinkering with the 1972 Anti-Ballistic Missile (ABM) Treaty banning nationwide ballistic missile defenses. This Russian opposition combined with congressional pressure to advance a national missile defense system ultimately stalled START III and frustrated further progress in U.S.-Russian strategic nuclear reductions. In October 1999, the Senate even rejected Clinton's prize achievement, the 1996 Comprehensive Test Ban Treaty.

President George W. Bush took office in January 2001, halfway through the sixth decade of the nuclear era, with a new vision for America's foreign policy. In part, his thinking embraced ideas long advocated by a group of policy entrepreneurs known as the neoconservatives, who had been highly suspicious of U.S. arms limitations agreements involving nations that could not be trusted, in their view, to keep their promises. They adapted their ideology rapidly to post-Cold War circumstances by arguing that formal bilateral arms control agreements with a friendly Russia were no longer appropriate to the changed relationship. Global arms control agreements were a snare and a delusion because they equated the "good guys" with the "bad guys" and unduly constrained U.S. freedom of action. Bush essentially accepted that point of view.

Bush also quickly initiated steps to impose his own vision on the U.S.-Russian strategic nuclear relationship. His new paradigm was overdue in the

White House

On July 31, 1991, President George H. W. Bush and Soviet President Mikhail Gorbachev sign the Strategic Arms Reduction Treaty (START).

sense that his father and Clinton might have been able to act more rapidly to move out of the shadow of mutual U.S.-Russian nuclear deterrence had political circumstances at home and abroad been more favorable. They were not able to do so, but George W. Bush made a major effort during his first year in office to define a new relationship between Russia and the United States. Bush and Russian President Vladimir Putin on November 13, 2001, released a document, "Joint Statement on a New Relationship Between the United States and Russia," announcing an alliance-like relationship between the two countries. The two presidents bluntly stated that "[t]he United States and Russia have overcome the legacy of the Cold War. Neither country regards the other as an enemy or threat." They called for "the creation of a new strategic framework to ensure the mutual security of the United States and Russia, and the world community." They asserted, as a fact, not merely an aspiration, "that the members of NATO and Russia are increasingly allied against terrorism, regional instability and other contemporary threats."

Having reinforced the proposition that Russia and the United States were partners in mutual security facing adversaries bent on acquiring nuclear weapons, Bush felt able to achieve one of his major goals: U.S. withdrawal from the ABM Treaty. The president announced this act in a December 13, 2001, Diplomatic Note, which gave notice to the governments of Russia, Belarus, Kazakhstan, and Ukraine—the recognized successor parties to the treaty after the Soviet Union's breakup—that the United States intended to withdraw from the agreement at the end of the six-month waiting period as allowed in the treaty. That note describes the changed threat environment that the U.S. administration saw at that time:

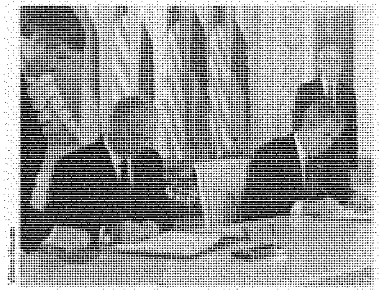
> A number of state and non-state entities have acquired or are actively seeking to acquire weapons of mass destruction. It is clear, and has recently been demonstrated, that some of these entities are prepared to employ these weapons against the United States. Moreover, a number of states are developing ballistic missiles, including long-range ballistic missiles, as a means of delivering weapons of mass destruction. These events pose a direct threat to the territory and security of the United States and jeopardize its supreme interests.

As to the Russian nuclear threat posed to the United States, the U.S. note stated, "We have entered into a new strategic relationship with Russia that is cooperative rather than adversarial."

If confirmed by subsequent events, this note and its date deserve a place in history, along with the November 13, 2001, Joint Statement. Taken at face value, the two statements seem to mark the formal end of the era of mutual nuclear deterrence between Russia and the United States. Yet, concerns persist that these two declarations by Bush did not reflect objective reality and were primarily connected to the impending abrogation of a treaty that he and his supporters had long disliked. Either way, a valid question remains: Has mutual nuclear deterrence between the United States and Russia really ended? The ABM Treaty, which had been the cornerstone of the mutual deterrence relationship between the Soviet Union and the United States, was no longer necessary, in the judgment of the Bush administration. Putin obviously did not share that view, describing the U.S. action as a "mistake." Furthermore, a Pentagon report submitted December 31, 2001, to Congress showed how far the two countries still had to travel to truly erase nuclear deterrence from their national memories.

In this congressionally mandated report, known as the Nuclear Posture Review, Secretary of Defense Donald Rumsfeld laid out the direction for U.S. nuclear forces over the following five to 10 years. In a larger sense, the document began connecting what Bush had been saying about the U.S.-Russian relationship with what the U.S. defense establishment actually did. The previous review, conducted by the Clinton administration in 1994, had concluded that the capabilities of the former Soviet Union remained a major concern in assessing the military requirement for U.S. strategic nuclear forces. The authors of the earlier report argued that the United States must be prepared for the possible emergence of a hostile Russian government or the failure of the arms control process in the former Soviet Union.

In contrast, Rumsfeld wrote in his foreword to Congress that the United States "will no longer plan, size, or sustain its forces as though Russia presented merely a smaller version of the threat posed by the former Soviet Union." Yet, in the report's body, the Department of Defense hedged, asserting, "Russia's nuclear forces and programs nevertheless remain a concern...in the event that U.S. relations with Russia significantly worsen in the future, the U.S. may have to revise its nuclear force levels and posture." The Pentagon planned to accomplish this by drawing on what it called a Responsive Force, essentially a reserve force, which could be available "in weeks, months, or even years." The report stated that "operationally deployed forces" are sized "to meet the U.S. defense goals in the context of immediate, and unexpected contingencies." As the report explained, "[A] contingency involving Russia, while plausible, is not expected."



Russian President Vladimir Putin and U.S. President George W. Bush sign the Strategic Offensive Reductions Treaty (SORT) on May 24, 2002. SORT commits the United States and Russia to operationally deploy less than 2,200 strategic warheads each by December 31, 2012, after which the limit expires.

Presumably driven by these concerns, the report concluded that 1,700–2,200 nuclear warheads in the operationally deployed strategic force by 2012 would support U.S. deterrence policy and thus meet U.S. security needs. The Responsive Force, those weapons not operationally deployed, would contain several thousand more nuclear warheads, while U.S. strategic bombers and missiles would be retained rather than being destroyed. Later, in June 2004 the Bush administration announced that total holdings of nuclear warheads would be cut almost in half, leading to estimates that there will be approximately 6,000 warheads in the total U.S. stockpile (i.e., warheads operationally deployed plus those in reserve) in 2012 after those reductions have been made. Planning and budgeting functions in the U.S. defense establishment for the nuclear forces obviously still assign a heavier weight to Russia's nuclear capabilities than should be the case given the changed relationship formalized by Bush and Putin.

Legally binding codification of the U.S. nuclear planning recommendations came in the form of the Strategic Offensive Reductions Treaty (SORT), also known as the Moscow Treaty, signed by Bush and Putin in Moscow on May 24, 2002. The treaty commits the two countries to having no more than 1,700–2,200 operationally deployed strategic nuclear warheads each by December 31, 2012, although there was no agreed definition of what was to be counted in that aggregate and after that date there would be no numerical limits. The November 13, 2001, Joint Statement was cited in justifying the commitment. The two countries agreed that compliance with the treaty's provisions would be verified by the procedures and systems agreed to in the 1991 START, which expires in 2009.

More interesting and potentially more important than SORT was a Joint Declaration issued by the two presidents the same day. That declaration, reinforcing the ones made several months earlier, affirmed that "the era in which the United States and Russia saw each other as an enemy or strategic threat has ended." It outlined several topics for further discussion, including:

- Joint research and development of missile defense technologies;
- Cooperation on missile defense for Europe;
- Strategic offensive reductions to the lowest levels consistent with their national security

requirements and alliance obligations, reflecting the new nature of their strategic relations; and

- Measures, including transparency, to supplement further strategic offensive reductions.

A vigorous implementation of these programs would consolidate the changed relationship in practical ways.

Yet, the task of escaping from the mutual assured destruction trap has not been completed, nor is it fully reflected in the Defense Department's budgeting and planning or in the sizing of the operationally deployed and reserve nuclear forces. It remains a challenge for Bush's second administration to change the remaining missions of these forces to conform to his policy statements.

Even so, the Bush administration has emphatically asserted that nuclear deterrence should be erased from the relationship with Russia. Particularly striking was Bush's December 13, 2001, statement that "the greatest threats to both our countries come not from each other, or from other big powers in the world, but from terrorists who strike without warning, or rogue states who seek weapons of mass destruction." This implies that the size and characteristics of U.S. nuclear deterrent forces should be determined by the terrorist or rogue state threat, not by Russia or other major nations. The Bush administration also has accepted as a planning principle the idea that the appearance of unanticipated threats in the strategic environment can be accommodated by activating elements of what it calls the Responsive Force. An important component of this planning concept, which is a contemporary version of "reconstitution," is the infrastructure for nuclear weaponry, as discussed in the Nuclear Posture Review.

Rethinking Deterrence

Planning for U.S. nuclear forces will inevitably take into account plausible scenarios in which the use of nuclear weapons by the United States might seem to decision-makers of the future to be a necessary option, although a thoroughly unattractive one. Our thesis is that, even if one accepted the validity of these scenarios, some of which we describe below, the requirements for nuclear weapons do not add up to anything like the Bush administration's projected numbers. Our view is that most of the potential military tasks we cite could be accomplished with modern conventional weapons.

An example of "well recognized current dangers" in the Nuclear Posture Review is "a military confrontation over the status of Taiwan" with China. Tensions in the Taiwan Strait eased somewhat following the 2004 Taiwanese elections, which tended to reaffirm the "one China" doctrine supported by the United States and China. They have risen again with the passage of the anti-secession law in Beijing in March 2005, but the Nuclear Posture Review had longer-range reasons for worrying about China in its discussion of sizing the nuclear force. It called attention to "China's still-developing strategic objectives and its ongoing modernization of its nuclear and non-nuclear forces." CIA director Porter Goss echoed these thoughts in February 16, 2005, congressional testimony: "China continues to develop more robust, survivable nuclear-armed missiles as well as conventional capabilities for use in a regional conflict."

China's long-range strategic nuclear forces (i.e., those capable of striking U.S. territory) have held steady at about two dozen single-warhead missiles for many years. China's military modernization has emphasized survivability of their nuclear forces and a non-nuclear buildup, including aircraft and missiles based opposite Taiwan. Thus far, the evidence is not clear as to whether its nuclear modernization plans include a major increase in force levels. As a rapidly rising economic power, however, China has the long-run potential to be a formidable military power. So, in addition to the role of U.S. nuclear forces in assuring allies such as Japan and South Korea and encouraging prudent behavior on all sides, the Bush administration's notion of dissuading any future military competition with the United States comes into play.

This concept of dissuasion broadens the definition of how nuclear weapons can play a part in today's diplomacy. It warrants careful examination because the Bush administration emphasizes its importance as a different concept from deterrence. In fact, the distinction between them depends on individual circumstances. Against a major nuclear power such as Russia, the distinction between deterrence and dissuasion is somewhat artificial. When the Bush administration's September 2002 National Security Strategy of the United States speaks of dissuading potential adversaries from pursuing a military buildup, the idea amounts to deterring a peacetime activity from occurring that could present a future threat to peace and security. There are ways to accomplish this that do not rely on an instantly useable force, for example, the threat of a U.S. military buildup, but the idea also has been applied to would-be "peer competitors" in the hope of dissuading such nations from even thinking of competing with U.S. military forces. Thus, the National Security Strategy states that "[o]ur forces will be strong enough to dissuade potential adversaries from pursuing a military build-up in hopes of surpassing, or equaling, the power of the United States."

Overwhelming destructive force is a convincing deterrent to the use of force against U.S. interests, but it has its limits. History does not support the notion that superior force in itself is sufficient to dissuade a weaker state from strengthening its defenses. Recent experiences in Korea, the Middle East, and South Asia does not support it either. Instead of encouraging restraint, an arms race is the typical result. It would not make sense to indulge in nuclear overkill in the attempt to persuade China not to try to surpass U.S. power. Many other factors, especially economic ones, will help determine that decision. Increasing U.S. operationally deployed forces to dissuade China from building the kinds of forces that it thinks are necessary to achieve its regional goals would probably have an effect opposite to the one intended.

> *History does not support the notion that superior force in itself is sufficient to dissuade a weaker state from strengthening its defenses.*

To be effective, a dissuasive posture must be accompanied by explicit incentives. Otherwise, it is merely another variant of assured destruction—useful in deterring attack, less useful in dissuading an adversary from improving his military position.

New Goals for Deterrence?

For the foreseeable future, there are no other "big powers" that U.S. nuclear forces need to deter, dissuade, or defeat. France, Israel, India, Pakistan, and the United Kingdom have nuclear weapons but are not currently adversaries, and their nuclear forces are much smaller than those of the United States. Hence, the remainder of this discussion can turn to the implications of the new strategic paradigm for what Bush has called the "crossroads of radicalism and technology": rogue states and terrorist groups that try to acquire nuclear weapons and who, if successful, might then think of using them against their enemies, including the United States.

It is not out of the question that a war could yet develop from one or the other of the two most pressing proliferation situations, Iran and North Korea, but what role could U.S. nuclear weapons play? Nuclear weapons might be thought to be necessary if a conventional war got out of hand. Some analysts suggest that a nuclear weapon might be used against a stockpile of biological agents, for example, as a means of pre-emptively eliminating a developing threat before it matures. Deep underground, hardened shelters have been mentioned as possible targets for nuclear weapons because non-nuclear weapons might not be powerful enough. Yet, the potential targets for nuclear weapons appear to be very small, as the following analysis suggests.

U.S. nuclear weapons have not been useful in preventing the acquisition of nuclear weapons by states determined to have them and will clearly not dissuade al Qaeda from attempting to make or steal them. Some experts argue that new nuclear weapons are needed because existing ones cannot reach deep underground bunkers where weapons of mass destruction may be stored. It is doubtful, however, that having new nuclear bunker busters in the U.S. inventory would dissuade an adversary convinced of the need for a nuclear deterrent. (See Section IV for further discussion of this issue.) Neither the vast nuclear superiority of the United States, nor the prospect of a U.S. ballistic missile defense system, has as yet succeeded in stopping North Korea's drive to build a nuclear deterrent of its own. The same may be true for Iran. In both cases, however, the United States, up to this writing, has not been willing to offer any substantial upfront incentives, relying instead on pressure and threats. As noted above, the dissuasive effect of nuclear weapons is likely to be most effective when coupled with measures that meet the adversary's security and economic requirements.

As to deterring the use of nuclear weapons, the administration and most independent experts acknowledge that nuclear deterrence has little effect on suicidal, fanatical terrorists. Martyrdom is something welcomed by Islamic fundamentalists. Otherwise, no role for U.S. nuclear weapons in any mode is very likely in the case of terrorists. The best way of blocking nuclear-armed terrorism is to prevent nuclear weapons or materials from escaping the control of responsible governments.

What about the rogue states of the world? They surely have something of value to lose if a nuclear attack were launched against them. Nuclear deterrence probably would work to prevent the use of nuclear weapons by Iran, for example, against the United States or its allies. North Korea already may be a small-scale nuclear-weapon state, as it alleges, but powerful neighbors all around North Korea contain it. The first use of nuclear weapons by North Korea cannot be excluded under some unlikely circumstances, but a credible U.S. nuclear deterrent can be had at very low levels of forces and certainly without acquiring new bunker busters. For example, a last-ditch suicidal gesture by North Korea's leadership in the endgame of a losing war cannot be ruled out, but the levels and types of U.S. nuclear forces are irrelevant to this situation.

U.S. military and intelligence documents also identify Syria as a potential nuclear proliferant. Then-CIA director George Tenet told the Senate that Syrian nuclear intentions were being "closely monitored." He reported that Syria was developing longer-range missile programs, such as Scud D. There is no indication that U.S. nuclear weapons would come into play in this situation any more than they did in Iraq.

As to other "generic" rogue states, it may be that, if substantial U.S. conventional forces could not be brought to bear in a war launched by a rogue state against a U.S. friend or ally, nuclear weapons might be seen as the only answer, especially if the aggressor had used biological or chemical weapons. This worst-case scenario, of course, is what has caused the Bush administration to declare that it will use military force, not excluding nuclear weapons, to anticipate an emerging threat posed by such weapons. This was the administration's case for war against Iraq. Such a decision would have very serious consequences, as will be discussed in Section II.

Is it likely that there will be many instances where an anticipatory action against a rogue state to prevent a nuclear weapons capability could be prosecuted? Probably not, as we elaborated in more detail in *The Gravest Danger: Nuclear Weapons*.[1] In fact, the 2002 National Security Strategy stipulates that force, non-nuclear as well as nuclear, would not be used in all cases to pre-empt emerging threats. The two cases of Iran and North Korea already show that military force has its limitations. Using nuclear weapons would be very unlikely and not only because the regional political and human costs would be very high. Most decisions to initiate preventive action have to be taken under conditions of huge uncertainty. There will inevitably be gaps and incorrect information about essential facts. This is the very nature of intelligence information and is one of the reasons for exhausting all possible avenues of diplomacy before relying on force.

To sum up, even without ruling out a possibility, however unlikely it may seem today, of circumstances that would lead the United States to resort to first use of nuclear weapons, the numerical requirements for U.S. warheads to prevent nuclear use by rogue states or terrorists are very low. It is not nuclear deterrence but activities such as the Cooperative Threat Reduction program that are key to preventing nuclear terrorism.

---

[1] Sidney Drell and James Goodby, *The Gravest Danger: Nuclear Weapons* (Hoover Institution Press, 2003).

Nuclear Deterrence in the 21st Century

Nuclear deterrence theory and practice were developed and implemented in a unique historical era, one in which the protagonists competed in a highly focused bipolar mode in the arena of nuclear weaponry. (See Appendix 1.) The United States and the Soviet Union came to share many beliefs about nuclear weapons and they cooperated, both formally and tacitly, through much of the Cold War to make sure that their nuclear weapons were not used against each other. Nevertheless, it was an imperfect way, at best, of managing nuclear competition. By the 1980s, both governments were convinced that deterrence required them to maintain nuclear forces that could survive a first strike and then launch a retaliatory strike capable of delivering assured destruction against the other. It was a prescription for overkill on a scale unique in history.

Illustrative of this thinking was an article written by Paul Nitze in *Foreign Policy* in the winter of 1976–77.[2] Nitze tried to answer the question "How much is enough?" He argued that, "to keep the Soviet population hostage to a countervalue attack," the United States needed "something of the order of 3,000 deliverable megatons remaining in reserve after a counterforce exchange." A counterforce attack is limited to targets of military value, such as actual weapons systems and command posts, whereas a countervalue strike targets an adversary's population, society, and economy. Nitze's prescription translated into a strategic nuclear force of several thousand missiles and bombers capable of delivering many thousands of warheads. This effort was required, Nitze believed, because the Soviets were bent on "deterring the deterrent." They wanted to be able, after a counterforce attack on the United States, to have sufficient reserve megatonnage to hold the U.S. population and industry hostages.

Analyses of this type were a direct outgrowth of Secretary of Defense Robert McNamara's early 1960s conclusion that "assured destruction is the very essence of the whole deterrence concept." He was one of the first to try to answer the question "How much is enough?" Nitze had adapted the assured destruction idea to the technology of succeeding decades and had made the seemingly rational case that U.S. presidents should have options other than an all-out attack on Soviet population and industry even after a Soviet attack aimed at U.S. nuclear strike forces. It is unlikely that the combination of circumstances that made such an extravagant version of nuclear deterrence almost inevitable will appear again.

In the present era, what is being said about the case where dissuasion and deterrence both fail and a confrontation should come with a big power armed with nuclear weapons? The February 2004 report of the Defense Science Board Task Force on Future Strategic Strike Forces suggested that the United States should try first to transform relations through dissuasion and assurance. If that failed, the objectives should be:

- "To dissuade, to deter, and to prevail, while minimizing the prospects of unwanted escalation and damage to allies; and

---

[2] Nitze, Paul H., "Deterring Our Deterrent," *Foreign Policy*, no. 25 (Winter 1976–1977) pp. 195–210.

- To terminate the conflict as quickly as possible on terms consistent with U.S. values and objectives."

There is nothing here about protracted nuclear war. Rather, the emphasis is on avoiding escalation and ending the conflict.

The task before us now is to analyze how deterrence/dissuasion works in present circumstances and what are the implications for the size of the U.S. nuclear arsenal:

- in the case of former adversaries (i.e., Russia)
- in the case of present adversaries
- in the case of potential adversaries
- in regional conflicts, for example, the Middle East
- in the special cases of the threatened use of biological and chemical weapons, where the Bush administration has reserved the right to use nuclear weapons if attacked with such weapons.

The connection between nuclear deterrence and other forms of military deterrence exercised by the United States should also be considered in relation to the objective of preventing both nuclear proliferation and the use of nuclear weapons.

Russia

The bipolar nuclear competition of the Cold War era has largely been liquidated, but the legacy of those days still exists in a lingering mistrust between Moscow and Washington. The Nuclear Posture Review furnished evidence of this enduring distrust, as do current nuclear force deployments.

If the Bush-Putin statements are taken literally, it should suffice to have a responsive force to hedge against renewed hostility in the U.S.-Russian relationship. Ready-to-launch, operationally deployed nuclear forces should not be required between two countries that mutually declared in November 2001 that they do not regard each other as an enemy or threat. Deterrence/dissuasion, in the case of Russia, now should be seen logically as applying to peacetime behavior, not to the existential act of launching a strategic nuclear attack. Thus, the threat of activating a "responsive force" of the type described in the Nuclear Posture Review should dissuade or deter Russia from embarking on a renewed nuclear arms race. Further verifiable U.S.-Russian nuclear weapons reductions would also decrease the possibility that either side could quickly rearm in a way that would upset strategic stability. In Section III, we will discuss appropriate and much smaller transitional force deployments, taking into account the historical baggage that acts as a brake on more rapid reductions, as well as other deterrent tasks.

Present Adversaries

The cases of present adversaries, such as North Korea and Iran, are more complex. France, Germany, and the United Kingdom are now involved in an intensive effort to dissuade Iran from becoming a nuclear-weapon state. For the Europeans, incentives are a big part of the effort. Until recently, the United States has been watching skeptically from the sidelines, considering that the threat of economic sanctions is the main card to be played, although that position seems to have changed somewhat since Bush's February 2005 trip to Europe. Efforts at dissuasion may have already failed in preventing North Korea from becoming a nuclear-weapon state. There has been no progress as of this writing in the six-party talks involving the United States, China, Japan, Russia, South Korea, and North Korea. Very few incentives have been offered to North Korea, whose leaders broke earlier commitments not to pursue nuclear weapons. In the two cases of Iran and North Korea, what does it mean for dissuasion to fail, and what should the United States do if North Korea or Iran openly deploys nuclear forces and engages in threatening policies or actions?

An anticipatory U.S. attack might be expected as the next step, according to the theoretical deterrence ladder constructed by the Bush administration. The administration has said, however, that military action is not always appropriate, and so far, the option of preventive war has not been exercised in the case of North Korea, the more advanced of the two potential new nuclear-weapon states and the only one to claim it already has nuclear weapons. In fact, Bush has emphasized that the circumstances in this case demand a diplomatic approach. The administration restated this position even after the North Korean government made its most explicit claim of manufacturing nuclear weapons in February 2005. If diplomacy is to be pursued with any reasonable hope for success, incentives as well as threats must be included among the tools used. Otherwise, the unadorned threat of assured destruction of targets in North Korea would be seen by most U.S. friends in Northeast Asia as all that diplomacy has to work with. They would see that as out of proportion to the provocation presently being offered, posing the risk of widespread devastation in Korea and elsewhere in Northeast Asia. As things stand, the United States is still leaving to others the role of offering up-front incentives, while hinting at rewards that would greatly benefit North Korea after it dismantles its nuclear programs.

Deterrence in Korea may now be forced to return to its more limited Cold War meaning of preventing a North Korean attack on the United States or North Korea's neighbors. Containment, the other component of U.S. Cold War strategy, also seems to be relevant in Northeast Asia, following what increasingly appears to be the failure of the dissuasive phase of deterrence. A pre-emptive U.S. attack almost certainly would lead to massive destruction. This appears to be presently ruled out by the Bush administration. The familiar options of countervalue and counterforce will be available for deterrence, although on a scale that is miniscule as compared with the U.S.-Soviet competition.

Potential Adversaries

Like Russia, China presents a special case. The United States and China are working fairly closely together on security issues and are strongly linked by trade and financial interests. Nevertheless, it is understood that China's long-range retaliatory capability has the United States in its crosshairs in some way. Similarly, the target list for U.S. nuclear forces presumably includes Chinese targets. Taiwan, of course, could become a major flashpoint in the bilateral relationship at any moment. China remains a potential adversary. The adversarial relationship and the concomitant threat of nuclear attack have not been formally excluded from the U.S.-Chinese relationship as they have from the U.S.-Russian relationship, but U.S. policymakers have not invoked the threat of nuclear retaliation as a response to potential Chinese incursions in the Taiwan Strait since President Dwight Eisenhower's administration.

As the Nuclear Posture Review states, nuclear weapons can assure allies, and this is particularly the case with Japan, a country that has set great store by the U.S. "nuclear umbrella." This is an important role for U.S. nuclear weapons, for the presence of that umbrella has made it easier for the Japanese and other allies to continue their renunciation of nuclear weapons. There now are pressures coming from influential groups in Japan to amend Japan's constitution with regard to the renunciation of war. Japan's non-nuclear-weapon status has also been questioned. The role of the U.S. nuclear umbrella may be less dispositive in Japan in the future than it has been in the past, but it may still be useful in thwarting a nuclear arms race between China and Japan.

If deterrence of a Chinese attack on Taiwan were to fail, the U.S. response would very likely be a move to defend Taiwan. U.S. use of nuclear weapons would almost certainly not be the first step in an attempt to convince China to stop military action, but one cannot totally rule out any circumstances where a limited nuclear response might be considered. A credible U.S. deterrent against the current threat of China can be managed while reducing the number of warheads. The United States certainly does not need additional nuclear weapons to achieve some dissuasive effect.

AP/Xinhua

Chinese ships stage a mock attack on an island in the Taiwan Strait in 1996, according to information released by China's government-run Xinhua News Agency. In March 2005, Beijing adopted legislation authorizing the use of military force against Taiwan if it asserts its independence.

What should the United States do if China began a buildup of the type that the Soviet Union began after the 1962 Cuban missile crisis? For quite a while, present or even greatly reduced U.S. nuclear force levels would suffice to maintain the direct deterrent effect against a Chinese attack on Taiwan. Present U.S. superiority is such that a number of years would pass before the buildup of China's nuclear forces would require additional U.S. warheads to target the new threat or reinforce the deterrent against any imprudent behavior. There is no doubt that, in the present situation where peace is conditional, the U.S. government would see a need for maintaining the capability for an appropriate nuclear response. Further, that course of events would have repercussions in the U.S.-Russian relationship. The U.S. nuclear force structure is only one of the factors influencing China's force posture decisions, but deeper reductions in U.S. operationally deployed nuclear forces than presently contemplated might contribute to dissuading China from a major buildup. This point is discussed further in Section V.

Regional Conflicts

Europe, where the nuclear confrontation was most intense during the Cold War, is not likely to be the scene of conflict or disputes that would rise to the threshold where nuclear deterrence would become a consideration. The North Atlantic Treaty Organization (NATO) commits each of its 26 members to regard the security of other members as its own. A response to an attack on any one of them could include the counter-use of U.S. nuclear weapons according to

NATO doctrine, but as a practical matter, nuclear deterrence has essentially disappeared from NATO's missions. No doubt the attraction of NATO for eastern European countries lies in the connection it affords to overall U.S. military strength. Attractive power is not to be lightly dismissed, but this is as far as it goes, as far as the present-day role of nuclear deterrence is concerned. Reportedly, the United States maintains a stockpile of tactical nuclear weapons in Europe. No need exists for them under present circumstances, and they should be removed.

Three other regions where simmering disputes have boiled over into open conflict and could do so again are the Middle East, South Asia, and Northeast Asia. In the Middle East, the United States has been and remains an active player in regional security issues. In 1973, President Richard Nixon put U.S. nuclear forces on alert to send a warning signal to the Soviets that they should not intervene in the Middle Eastern war of that year. Prior to the 1991 Persian Gulf War, Secretary of State James Baker hinted at the use of nuclear weapons if Saddam Hussein used chemical or biological weapons. A stated if unsubstantiated reason for the U.S. invasion of Iraq in March 2003 was to eliminate the possibility that Iraq would build nuclear weapons. The dispute with Iran over its nuclear programs has evoked some media and even official discussion of air attacks on Iranian nuclear facilities, like the 1981 Israeli attack that destroyed Iraq's Osirak reactor.

In such a volatile region, where nuclear weapons have figured in several disputes, it is reasonable to think that U.S. nuclear weapons must exercise some deterrent effect. If a war with Iran were to occur, for example, U.S. nuclear weapons looming in the background might suggest to Tehran that the war should be limited and terminated as soon as possible. In other cases, their deterrent effect is probably negligible as compared with Israel's own nuclear deterrent and other actions that the United States is capable of taking. Their deterrent effect against use of biological or chemical weapons by Hussein in the Persian Gulf War is far from clear. George H. W. Bush apparently believed that the threat of regime change would be a more effective deterrent than the use of nuclear weapons, and perhaps it was. The most likely result, if deterrence failed in the Middle East, would be a war fought with conventional weapons and, as is being demonstrated in Iraq, by asymmetric warfare on the part of U.S. adversaries.

South Asia presents even fewer scenarios where U.S. nuclear weapons would deter or dissuade a protagonist from taking actions that the United States wanted to prevent. Would Washington authorize the use of U.S. nuclear weapons against India to stop an Indian attack against Pakistan? Would it consider an attack on Pakistan to stop a war that Pakistan had started? The answer is no in both cases; it is simply inconceivable. The only plausible situations in which U.S. nuclear deterrence might come into play in South Asia is in the context of a radical Islamist government in Pakistan gaining control of its nuclear program or reassurance to India in the event of a serious dispute with China. These contingencies are not out of the question, but the effect of U.S. nuclear deterrence is apt to be marginal in either case.

A crisis in Northeast Asia has more potential for erupting into a conflict. As already discussed, the assured destruction/containment type of deterrence is essentially where things stand now. The three U.S. goals are to deter North Korea from invading South Korea, to deter North Korea from launching missile attacks against Japan or South Korea, and to deter North Korea from using nuclear weapons under any circumstances. Actual U.S. use of nuclear weapons would probably be constrained by the opinions of all of North Korea's neighbors, but that should not diminish their deterrent effect against Pyongyang's use of nuclear weapons, except perhaps as a last desperate act of a defeated regime.

Biological and Chemical Weapons

In many of the cases discussed so far, preventing an adversary's use of biological or chemical weapons would be a key U.S. goal, as it was in the Persian Gulf War and the 2003 invasion of Iraq. In neither case was a threat to use nuclear weapons made explicit. War crimes trials against any Iraqi commanders who authorized the use of "weapons of mass destruction" were explicitly guaranteed by the United States. Other countries with biological or chemical weapons could give rise to similar challenges in the future. Deterrence, not necessarily nuclear, would have two components in each situation: to dissuade development, deployment, and plans for use of biological or chemical weapons and to deter the actual use of such weapons. The first objective, one of those that seems to be included in the Bush administration's strategy, is important but will be difficult to accomplish in practice. Biological and chemical weapons can be manufactured covertly and relatively easily. More than 15 countries, several of which are hostile to the United States, are believed to be pursuing or already to possess such arms, of which perhaps up to one-third are "states of concern." They see these as their own deterrents and will be reluctant to give them up. Once again, this type of dissuasion, which is aimed at influencing other countries' force structure decisions, cannot be carried out effectively, if at all, without accompanying incentives. One of the most important incentives would be to improve the security situation for the countries concerned by settling regional disputes.

The other goal of preventing biological or chemical weapons use in combat may be easier to achieve, although the record of the Iran-Iraq War waged in the 1980s is not very encouraging on this score. Of course, the United States was not directly involved, aside from providing Hussein intelligence information, but no effort was made to punish Iraq for initiating chemical weapons attacks. In a case where U.S. or allied forces might be involved in the future, an explicit U.S. threat to use nuclear weapons in retaliation for use of chemical or biological weapons might be considered. Before voicing that threat, however, it must be weighed against other very troubling considerations, including the issue of whether nuclear weapons should be used against non-nuclear-weapon states, the advisability of ending 60 years of non-use of nuclear weapons in combat, and whether a nuclear response is proportional to a biological or chemical weapons attack. Nuclear weapons are unique in their terrifying potential for massive destruction on an unprecedented scale. Their capability for widespread destruction vastly exceeds that of chemical weapons. For now, this also holds true for biological weapons, which should be feared primarily for their terror-creating potential, although ultimately they may come to rival nuclear weapons as a threat to populations on a global scale. The present posture of "calculated ambiguity" regarding the U.S. response to an adversary's use of chemical or biological weapons is preferable to a more explicit threat. Unrivaled in conventional military power, the United States only diminishes its own advantages and strengths by pursuing nuclear weapons policies that boost the perceived value of biological and chemical weapons in the eyes of others.

The United States only diminishes its own advantages and strengths by pursuing nuclear weapons policies that boost the perceived value of biological and chemical weapons in the eyes of others.

Nuclear Deterrence in Context

This discussion underscores the point that nuclear deterrence cannot be considered in a vacuum, nor can it be seen as the only or even the most powerful deterrent available to the United States in every case. Experts spend a great deal of their time wondering whether a threat to use nuclear weapons is credible. A weapon that has not been used in combat for 60 years is not a weapon that is used lightly, and the consequences of its possible use are so dire that even the most irresponsible of rogues probably is impressed. To make the consequences less dire by making them "more useable" by lowering their yields is probably not going to do much to influence such people. Here, the subject is deterrence, and images in the minds of dictators are what count.

What is credible beyond doubt is that the United States has built the world's most effective and powerful war-fighting force, excluding its nuclear weapons. In fact, to the extent that the United States depends on nuclear weapons to make a point, the more this will encourage asymmetric warfare and biological and chemical weapons use on the part of U.S. enemies and the less effective future U.S. fighting forces will be.

The Nuclear Posture Review treats nuclear weapons as an embedded element in U.S. offensive forces. Of course, in the real world nuclear weapons are not treated simply as an extension of the most powerful conventional forces. They are treated separately. Their use would require exceptional circumstances, and no president has seen such exceptional circumstances, even in the midst of two otherwise unwinnable wars, Korea and Vietnam. Wisely, U.S. military leaders think of nuclear weapons as the ultimate deterrent and not just as another weapon. Former Chairman of the Joint Chiefs of Staff and future Secretary of State Colin Powell expressed this perspective clearly in his 1995 autobiography. "No matter how small these nuclear payloads were, we would be crossing a threshold. Using nukes at this point would mark one of the most significant political and military decisions since Hiroshima," Powell wrote.[3] An assessment about whether nuclear weapons should be used always takes place in the context of whether there is some non-nuclear weapon that could do the job. In short, nuclear weapons are not weapons of first choice, but of last choice.

---

[3] Powell, Colin L. and Joseph Persico, *My American Journey*, Random House. 1995, pg. 324.

SECTION 3

Implications for U.S. Strategic Nuclear Forces

U.S. Nuclear Force Size

In his foreword to the Nuclear Posture Review, Rumsfeld supported "a credible deterrent at the lowest level of nuclear weapons consistent with U.S. and allied security." Based on the analysis in the preceding sections, the Nuclear Posture Review's conclusions should be adjusted. It appears to be entirely possible and feasible to maintain a credible U.S. deterrent at much lower levels of nuclear weapons than were recommended in that report. It may have been reasonable to err on the high side at that time. The report implied that, stating, "[I]n a fluid security environment, the precise nuclear force level necessary for the future cannot be predicted with certainty....[T]he range of between 1,700 and 2,200 warheads provides a degree of flexibility." It is very difficult to escape from the mutual deterrence mindset, even after conditions have changed very considerably, but we think the United States can do better than it has.

As the preceding analysis pointed out, the Russia contingency, which is the danger of a hostile government taking power in the future, can be met through greater reliance on a smaller responsive force than currently planned and which need not be available in a matter of days or weeks, but months or even years. If operationally deployed nuclear warheads are not the prime deterrent against possible Russian actions, then they can be reduced to lower levels earlier than the date of 2012 prescribed both in the Nuclear Posture Review and in SORT. Certainly, the number could be much lower than the 3,800 operationally deployed U.S. warheads forecast for the end of 2007 by the Nuclear Posture Review.

Lower warhead levels reached more rapidly would be consistent with the Bush-Putin November 13, 2001, statement that "neither country regards the other as an enemy or threat." It also would be consistent with the 2002 Moscow Declaration in which Bush and Putin stated their intentions "to carry out strategic offensive reductions to the lowest possible levels consistent with their national security requirements and alliance obligations, and reflecting the new nature of their strategic relations." That declaration described SORT as "a major step in this direction." A straightforward reading of this passage implies that the two presidents did not see the treaty as the last word in strategic offensive reductions. Furthermore, the treaty itself included a clause that it could be "superseded earlier [than 2012] by a subsequent agreement." The Consultative Group for Strategic Security, which was established by the Moscow Declaration, could determine how to accomplish this revision. Chaired by the foreign and defense ministers of each country, this group has not yet proved effective or developed an agenda for addressing important issues such as this.

We believe that SORT should be amended to set a ceiling of 500 operationally deployed strategic warheads. This would be accomplished during a transition period that might last five years. Another 500 warheads could be held for the Responsive Force. Deeper reductions could be considered and possibly implemented during the five-year transition period, taking into account developments in China, among other things. The rationale for this conclusion follows.

First, as to the number of potential targets, we assume that Russian nuclear forces will decrease in numbers comparable to what we are proposing for the U.S. force. For reasons having as much to do with historical and political baggage as with military requirements, this assumption will be a major determinant of the size of the U.S. operationally deployed force, as it appears to be today. Even given the history, however, the numbers assigned to deterrence are much too high. In addition, the United States should, as we have argued, maintain a Responsive Force to counter the possibility of a resurgent and hostile Russia. Under these assumptions and taking into account the new relationship with Russia that Bush has proclaimed, we estimate that a U.S. strategic force of some 500 operationally deployed warheads would be more than adequate for deterrence. Borrowing the notion of the Nuclear Posture Review, this force level would be enough to provide a degree of flexibility in a fluid security environment.

This number is large enough to deal with the targets described generically in the Nuclear Posture Review as "instruments of political control and military power…leadership and military capabilities, particularly weapons of mass destruction, military command facilities and other centers of control and infrastructure that support military forces." We estimate these military targets, under the conditions we postulate, to number between 200 and 300, and we have sized the operationally deployed force of strategic warheads at a larger number of 500 for reasons of operational conservatism.[4] The excess allows for force readiness concerns, multiple targeting where needed, and the possibility of very sudden and unexpected surprises from Russia, for example, a breakdown in its military command and control caused by technical failures or a takeover by renegades. As Russia and the United States move farther away from the nuclear deterrent trap in which they are still ensnared, the sizing of their stockpiles would depend on other concerns and could be further reduced.

The 500 operationally deployed warheads would be augmented by those from the Responsive Force, which would be configured in two parts, the first able to respond to a rapidly building crisis—a Ready Responsive Force—and a second able to respond to strategic warning signals on a timescale of a year or more—a Strategic Responsive Force. This use of the Responsive Force underscores the need for sustaining an infrastructure for supporting it as well as the need to provide this force with appropriate hardening and concealment. As we look ahead a few years into the future, the total Responsive Force should have 400–500 warheads, a number comparable to the operationally deployed one. This number would be adequate to target roughly 200 additional Russian sites, for example, those affecting industrial recovery—the major nodes in the electric power grid and air, ground, and rail transportation systems, as well as major industrial sites. These targets and the forces to attack them may be viewed, we hope, as only temporary remnants of the Cold War policy of assured destruction that may be discarded before long in the dustbin of history.

U.S. Navy, Gene Royer

The U.S. Navy currently has 14 Trident nuclear-powered submarines for delivering nuclear weapons.

In time, nuclear deterrence might be maintained entirely with a Responsive Force without an operationally deployed force. That Responsive Force could consist of considerably fewer than 1,000 warheads, perhaps no more than the 500 that we postulate would initially be in the operationally deployed force.

---

[4] Pavel Podvig at Stanford's Center for International Security has suggested a notional Russian strategic nuclear force structure in the future. His analysis, based on their current production programs for a total force size of 1,500 warheads, suggests their strategic rocket forces sized to 600 warheads on 150 launchers and 500 warheads on their submarine force. These numbers will presumably decrease by agreement in proportion to the lowered ceilings proposed for the U.S. forces. See http://russianforces.org/podvig/eng/publicationsforces/20050100asp.shtml

See also: *The Nuclear Turning Point*, Harold A. Feiveson, editor, Brookings Institute Press, 1999; *The Future of U.S. Nuclear Weapons Policy*, National Academie
Posture for Today," *Foreign Affairs* (Jan./Feb. 2005).

Operationally Deployed Force

- Three Trident submarines on station at sea, each loaded with 24 missiles and 96 warheads (a mix of low-yield W76s and high-yield W88s). Reducing the D5 missiles' full complement of eight warheads to four per missile will substantially increase their maximum operating areas.
- 100 Minuteman III ICBMs in hardened silos, each with a single W87 warhead in a Mk12a re-entry vehicle.
- 20–25 B2 and B52H bombers configured for gravity bombs or air-launched cruise missiles.

Responsive Force

- Three Trident submarines, each loaded with 96 warheads, in transit or being replenished in port[5] for their next missions as part of a Ready Responsive Force for a rapidly building crisis, plus two or three unarmed boats in overhaul.
- 50–100 additional Minuteman III missiles taken off alert and without warheads, and 20–25 bombers, unarmed, in maintenance and training, all of which would comprise a Strategic Responsive Force, for a more slowly building confrontation.

Throughout the Cold War the United States insisted on maintaining a triad of strategic nuclear delivery systems—bombers plus land-based and sea-based ballistic missiles—to avoid common failure modes and vulnerabilities. There is value in retaining this diversity as the total stockpile is decreased to 1,000 warheads, as a way of preserving flexibility and confidence in reliability so long as operational costs do not exceed their perceived value.

The structure of the notional force of 1,000 warheads we are proposing is based on the existing elements of the U.S. nuclear arsenal and its delivery systems: ballistic missile-armed submarines; land-based ICBMs; and cruise missiles and strategic bombers. It is designed specifically to meet in a timely manner today's urgent challenge to take advantage of the opportunity opened by the new U.S.-Russian strategic relationship. We believe that moving out of the deterrence trap more expeditiously would help Russia and the United States work more cooperatively against the looming threat of nuclear weapons proliferation into dangerous hands. Bold actions by the two powers that still possess more than 90 percent of the world's nuclear warheads would be a powerful stimulus toward preserving and further strengthening a nonproliferation regime that is under severe strain. Meeting their commitments under Article VI of the 1968 nuclear Nonproliferation Treaty (NPT) to reduce their nuclear arsenals and work toward an eventual, no matter how

U.S. Air Force

The United States currently deploys 500 Minuteman III intercontinental ballistic missiles.

---

5. With reduced numbers of warheads below their current loadings, the Trident SLBMs will have significantly larger maximum flight ranges. For example, decreasing the modern Trident D5 loading from the current 8 warheads to 4 as proposed here translates into a 50 percent increase in the missile's maxio
in port as well as during transit. (See: John R. Harvey and Stefan Michalowski, "Nuclear Weapons Safety: The Case of Trident," *Science and Global Security*, 1994, vol. 4). In the event of further force reductions, to say a total of 500 warheads, there would most likely be a further reduction in the number of warheads carried by each individual boat in order to sustain a flexible on- station and in- port refurbishing cycle. This could be accomplished either by sealing off some of the 24 launch tubes on each Trident, or further downloading the number of warheads per missile, thereby further increasing their maximum range.

distant goal of eliminating them would be good for the nonproliferation regime. Moreover, it would also be good for their bilateral relationship.

In sum, we propose an appropriate U.S. force structure of 500 operationally deployed warheads, plus 288 warheads in a Rapid Responsive Force, and delivery systems in a Strategic Responsive Force capable of deploying up to 212 additional warheads. The United States and Russia should cooperate toward achieving this over the next five years, leading to forces of "500 plus 500 by 2010." It is a practical and timely step en route to the ultimate, if distant, goal of eliminating nuclear weapons. We recognize that achieving that vision would require a world fundamentally different from today's world, but the first steps can lead to changed circumstances and changed political and security relationships. This initiative can help pave a path toward realizing a vision that has been embraced by many world leaders and U.S. presidents since 1945.

> ***Bold actions by the two powers that still possess more than 90 percent of the world's nuclear warheads would be a powerful stimulus toward preserving and further strengthening a nonproliferation regime that is under severe strain.***

To Sustain This Force

Several existing defense programs will have to be carried forward with the appropriate priority in order to sustain a credible deterrent at lower levels. The first is stewardship of the Responsive Force. The current Defense Department plan is to achieve reductions to 1,700–2,200 operationally deployed warheads in the later stages of the process by downloading warheads from missiles and bombers and putting them into storage. As the Nuclear Posture Review states, "[D]elivery systems will not be retired following initial reductions and downloaded warheads will be retained as needed for the responsive force." If the Responsive Force is to serve as insurance against the need for a buildup, the Departments of Defense and Energy will have to treat it as such, including assigning resources to the upkeep of the delivery systems and warheads and contingency plans for reactivating the force.

The U.S. nuclear warhead infrastructure must also be maintained and updated as required if more reliance is to be placed on the Responsive Force to sustain and back up a credible nuclear deterrent. Planning to maintain a nuclear force structure of a given size must include an infrastructure able to refurbish or remanufacture the limited-lifetime components of a nuclear warhead as required. These components include, for example, a gas boost system that contains tritium with a half-life for radioactive decay of 12.3 years and the plutonium that constitutes the fission fuel.

The radiation environment created by the plutonium in the so-called pit of a nuclear weapon can lead to changes in its crystal structure that may affect its explosive performance, resulting in warhead failure. The stockpile stewardship program at the national weapons laboratories in the United States is increasing the understanding on which to base confidence in the lifetime of existing pits and in calculating the number of new ones that will have to be manufactured annually to maintain an arsenal. For example, a 1,000-warhead arsenal with pits that can age to 45 years before they need replacement requires an annual production rate, on average, of fewer than 23 certified pits.[6] This is well within currently envisaged U.S. production capacity and would remain true for a force double the size we recommend. If a longer lifetime for aging pits is proved out, it would further reduce the requirements. Such issues illustrate the necessity of maintaining a nuclear warhead production infrastructure for as long as the United States retains a nuclear force, but the requirements are quite modest compared to Cold War levels, with their much larger numbers of warheads and shorter anticipated pit lifetimes. The nuclear infrastructure must also sustain confidence in the long-term reliability of U.S. nuclear weapons as the United States works to reduce the size of its arsenal drastically. Currently, a comprehensive and rigorous science-based stockpile stewardship program is being successfully pursued at the Los Alamos, Lawrence Livermore, and Sandia National Laboratories. This program gives strong assurance that the current U.S. nuclear stockpile is reliable and will remain so for the foreseeable future.

More emphasis on adaptive planning also will be required to meet the contingencies discussed in preceding sections of this paper. As the Nuclear Posture Review explains, "[A]daptive planning is used to generate war plans quickly in time-critical situations." This will probably require an upgrading of U.S. command and control capabilities.

There are three final comments to be made on force size. First, the warhead numbers we discuss here are for the strategic nuclear forces and do not include the tactical nuclear arsenal. Reductions in the numbers of tactical weapons are a factor to be taken into account in implementing the strategic force reductions. The force structure we have outlined is a very conservative one in terms of target coverage, allowing for the fact that the door is closing too slowly on the Cold War orthodoxy of assured destruction thinking by the United States and Russia. After a transition stage of surely less than a decade, a further halving of the warhead levels should follow, with all remaining warheads being assigned to a Responsive Force.

---

[6] "Modern Pit Facility Draft Environmental Impact Statement," National Nuclear Security Administration, January 4, 2003. See <http://www.mpfeis.com>.

Second, this number of warheads would also cover for deterrence purposes all the other potential targets in other countries, assuming nuclear restraint elsewhere in the world. It is not necessary to have a separate deterrent force for each potential or present adversary because two or more nuclear conflicts at the same time is a very unlikely scenario. Pre-planning and adaptive planning can make use of deployed warheads for a variety of contingencies.

Third, in order to insure against the possibility of negotiated force reductions being rapidly reversed and to provide confidence to the rest of the world, the United States and Russia should negotiate verifiable procedures for destroying excess warheads and delivery systems beyond those slated for the operationally deployed and responsive forces.

Contingencies Involving Other Nations

As we noted earlier, future contingency planners are likely to consider whether nuclear weapons are needed to deal with conceivable wartime scenarios. Our view, to repeat, is that modern non-nuclear weapons almost certainly would be able to handle most foreseeable military challenges. Even if one assumes otherwise, the target list would not generate requirements for large numbers of nuclear warheads. Potential Chinese targets are likely to cover the same generic list as for Russia, cited above, including their strategic strike forces, command and control centers, major military bases, and ports in the vicinity of Taiwan. With China's long-range nuclear forces remaining at anything like their present levels, the target list would be considerably smaller than the 200–300 estimated for Russia. This list would not generate U.S. force requirements in addition to the numbers we have proposed for hypothetical emergencies involving Russia. The same warhead can be targeted against multiple designated ground zeros. Yet, if there were drastic changes in the worldwide strategic picture that led the United States to simultaneous major nuclear confrontations against Russia and China, the United States would evidently begin a major buildup of its own. This would take time, but so would a major Chinese buildup. The force configuration of "500+500" that we propose provides a ready basis for such U.S. action. The warhead delivery capacity of the Trident force can be doubled above the level to which we have proposed downloading it, and as we have described earlier, the United States would maintain a functioning nuclear infrastructure.

Regarding potential targets in North Korea or Iran, the list presumably would be much shorter because the territories are smaller, and the numbers of defense-related installations are much fewer than in Russia and China. That list would very likely be limited to single digits in each country.

SECTION 4

Are New U.S. Nuclear Weapons Needed?

Although the systems we propose for the "500+500" force were designed against a very different Cold War threat, they can readily be adapted to meet today's challenges to U.S. national security. Were the United States to start from scratch to build a new nuclear force structure to counter today's threats, it would very likely create different weapons incorporating newer technologies that would provide maximum flexibility to readily adjust to changes in the strategic scenario. Here, we will discuss potential benefits as well as problems with undertaking some of the technical changes that may be considered for adapting U.S. forces to the new post-Cold War strategic environment. In some cases, the changes would be straightforward and valuable to implement and are already underway. Others of questionable military value might prove more harmful than helpful to U.S. national security due to their potential, even likely negative impact on efforts to sustain and strengthen the nonproliferation regime. They should be rejected.

The United States has built and currently maintains a nuclear arsenal that is robust and reliable and should remain so for the foreseeable future. Congressional pressure during George H. W. Bush's presidency led the U.S. government to recognize that there was no need to develop and test new nuclear warhead designs. This resulted in a moratorium on underground nuclear tests that is still in effect. As a consequence, existing warheads are remaining in the arsenal for more years than originally anticipated and longer than had been the case during the first five decades of the nuclear era, during which the arsenal was being regularly modernized with new designs based on technological advances. An enhanced, multifaceted, science-based program of stockpile stewardship was established in 1994 to provide confidence to the U.S. weapons community and, through it, to the government that the health of the stockpile and the way in which special bomb materials age is well understood. This strong technical and scientific program at the national weapons laboratories is providing a deeper understanding of the performance of these weapons. Maintaining and refurbishing the warheads, as well as sustaining the competence of the weapons scientists, is proceeding, relying on comprehensive surveillance, forensics, diagnostics, extensive simulations with new computers, and experiments with advanced facilities. In fact, it has served to enhance confidence in the arsenal and in the U.S. ability to hear and heed any warning bells of unanticipated problems that may develop in the future.

One direct way to simplify the process of certifying the reliability and effectiveness of the warheads and to sustain this confidence over a longer period of time is to increase their performance margins. An example of this is to further enhance the explosive energy provided by the primary stage of a nuclear weapon above the minimum required to ignite the secondary, or main, stage of a nuclear weapon. A straightforward way to do this that requires no explosive testing to validate is by adjusting the boost gas fill in the primary during scheduled maintenance or remanufacturing activities. This is an example of an existing process for maintaining long-term high confidence in the arsenal. It is already available, has high merit, and should continue to be implemented.[7] This approach is the appropriate focus of effort for the Reliable Replacement Warhead (RRW) program currently being funded at the U.S. national weapons laboratories.

Turning the RRW program into an effort to develop new-warhead designs by altering the nature of the high explosives or the amount of nuclear fuel in the primary without testing, as some have suggested, would be a mistake. It takes an extraordinary flight of imagination to postulate a modern new arsenal composed of such untested designs that would be more reliable, safe, and effective than the current U.S. arsenal based on more than 1,000 tests since 1945. A comprehensive and rigorous stockpile maintenance program confirms and sustains this high confidence. If testing is resumed, the damage to the broader nonproliferation regime, and thus to U.S. security interests, would far outweigh any conceivable advantages to be gained from the new designs. Other nuclear-weapon states, most notably China, would surely follow the U.S. testing lead. Non-nuclear-weapon states would interpret resumed U.S. nuclear testing as a repudiation of Washington's NPT commitments, which could have serious implications for how they might then view their own treaty obligations.

It takes an extraordinary flight of imagination to postulate a modern new arsenal composed of such untested designs that would be more reliable, safe, and effective than the current U.S. arsenal based on more than 1,000 tests since 1945.

Two initiatives proposed by the Bush administration for developing new earth-penetrating weapons have also raised serious concerns. One calls for developing advanced concepts for very low-yield weapons that are advocated as being "more useable" for limited military missions, particularly against shallow underground targets, because of the reduced collateral damage they will cause. They are also proposed for neutralizing stored biological and chemical agents without dispersing them widely. A second program, called the Robust Nuclear Earth Penetrator (RNEP) program, would convert an existing high-yield, air-delivered nuclear bomb into an earth penetrator to make it more effective against deeply buried and hardened targets.

The need for such earth-penetrating weapons is highlighted in the Nuclear Posture Review, in order "to defeat emerging threats such as hardened and deeply buried targets" of military interest being built in many countries.

The effectiveness of warheads for destroying hardened underground targets is enhanced if their designs are sufficiently rugged so that, when delivered by aircraft or missile, they can be rammed into the earth intact and penetrate some three or more meters into the earth without damage before detonating. Such warheads will deliver a shock to destroy an underground bunker that is 10–20 times stronger than that of the same warhead exploded at or above the earth's surface, in which case much more of its blast energy would be spent in the atmosphere.

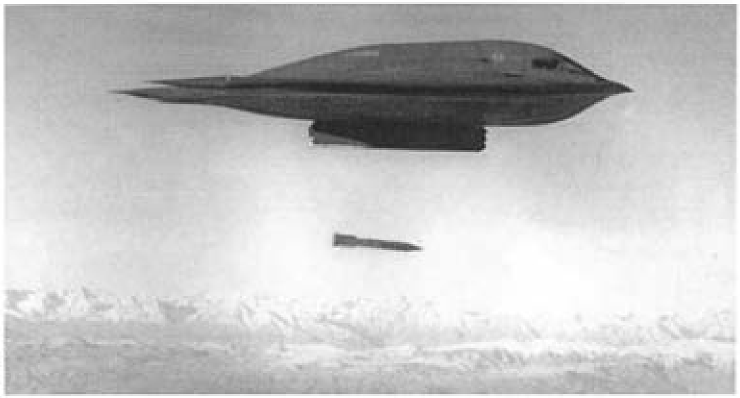
Many hardened underground targets are at relatively shallow depths of some 30 meters, particularly large industrial targets for manufacturing weapons or producing fissile material to fuel nuclear weapons. Other targets of very high value are more likely to be buried at depths of 300 meters or more and reinforced to withstand overpressures of 1,000 atmospheres or more. Assuming the optimal penetration capability into the earth, taking into account experimental data and known limits on material strengths, a warhead's yield would have to be significantly larger than 100 kilotons for the shock from its blast to reach down to 300 meters with enough strength to destroy such targets. That is certainly not a low-yield weapon. The primitive atomic bomb that pulverized Hiroshima had a yield of only 15 kilotons.

Low-yield warheads, with yields less than five kilotons, offer a possibility of attacking underground military targets at shallow depths, particularly those containing biological and chemical weapons. Their alleged value is that the reduced collateral damage they would cause makes them more useable. It is unavoidable, however, that any such warhead that has penetrated into the earth as deep as it can before detonating will still create a huge cloud of radioactive debris and a very large crater. The blast of even a very low-yield, one-kiloton earth penetrator, detonated at its maximum penetration depth of 15 meters into dry hard rock, will eject more than one million cubic feet of radioactive debris from a crater about the size of ground zero at the World Trade Center. A nuclear weapon with at least a 100-kiloton yield capable of destroying a hardened target 300 meters underground will dig a much larger crater and create a substantially greater amount of radioactive debris.

The technical realities of nuclear weapons and their value in destroying biological and chemical weapons must also not be exaggerated. In order to neutralize the deadly effects of biological pathogens and chemical gases, they must be subjected to very high temperatures or radiation levels. The energetic

---

[7] Executive Summary, JASON Report on Nuclear Testing, JSR-95-320 (August 1, 1995).



U.S. Air Force

The B61-11 bomb being dropped here is an earth penetrator currently in the U.S. nuclear arsenal. The Bush administration supports exploring modifications to the high-yield B83 warhead to make it an earth-penetrator as well.

neutrons and gamma rays emitted in a nuclear explosion that create such extreme conditions, however, do not travel many meters from the point of an explosion underground before they are absorbed by the earth. In contrast, the shock from the explosion will extend out far and wide, as is observed in earthquakes, spreading debris from large craters, as discussed above, that very likely will contain sizable quantities of the deadly agents.[8] Therefore, they would be more likely to spread these agents widely rather than to destroy them completely.

On quantitative technical grounds, one is led to conclude that low-yield penetrators are of marginal military value, useful only for relatively shallow targets. The collateral damage they cause may be reduced due to their lower yield, but the physical destruction, not to mention the political fallout, would still be very considerable. Recalling Eisenhower's warning in 1956 that, with nuclear weapons, "we are rapidly getting to the point that no war can be won" and that, although conventional wars can be fought to exhaustion and surrender, nuclear war can come close to "destruction of the enemy and suicide," does it make any sense at all to cross the nuclear threshold, especially for limited military missions?

What is the likely impact on U.S. security of a new initiative for new low-yield weapons? First, the United States already possesses tested and deployed weapons, both conventional and nuclear, that would be effective for missions against shallow bunkers. In view of that, a decision by the world's only superpower to develop and deploy new low-yield nuclear weapons as bunker busters that are presumably "more useable" in limited war-fighting situations, would send a clear, negative signal about the nonproliferation regime to non-nuclear-weapon states. If the United States, the strongest nation in the world, concluded that it could not protect its vital interests without relying on a newly developed nuclear weapon, it would be a clear signal to other nations that nuclear weapons are necessary for their security purposes too. This would hardly contribute to dissuading them from joining the nuclear club. In fact, because resumed nuclear explosive testing might eventually be required for a newly designed weapon, the United States would most likely deal a fatal blow to the nonproliferation regime in order to have a capability of questionable military value. Such concerns led Congress to refuse funding for this concept in the fiscal year 2005 budget. To date, the proposal for a new, low-yield nuclear earth penetrator has not been renewed in the fiscal year 2006 budget request.

The argument for the RNEP initiative to develop a high-yield earth-penetrating weapon is based on the goal of holding at risk hardened and deeply buried targets at depths of 300 meters or more. In this instance, we are talking about weapons with yields of hundreds of kilotons to megatons. This wartime situation may be one in which conventional weapons might not be able to do the job, and thus a nuclear weapon might be required. As such, this requirement needs thorough analysis.

---

[8] May, M. and Haldeman Z., "Effectiveness of Nuclear Weapons Against Buried Biological Agents," pgs. 91–114; and, and Nelson R. W., Nuclear 'Bunker Busters' Would More Likely Disperse than Destroy Buried Stockpiles of Biological and Chemical Agents," pgs. 69-90, *Science and Global Security*, vol. 12, nos. 1–2, 2004.

The need for such a capability was recognized and addressed appropriately for many years during the Cold War. The Soviet Union no longer exists, however, and, in words of Bush and Putin, neither the United States nor Russia "regards the other as an enemy or threat" but as "increasingly allied against terrorism."

If any new threats are emerging in other countries with deeper and harder targets than those presented by the former Soviet Union, the United States has a number of options for holding them at risk. One, of course, is to target them with several of our existing nuclear bombs with the highest yields. Furthermore, the effectiveness of these weapons can be greatly enhanced by improvements in precision of delivery and in accuracy of the intelligence in locating and identifying such targets. The United States also has a substantial ability to render hardened underground targets ineffective with conventional military systems. These kinds of targets have vulnerable points, such as air ducts and tunnel entrances for personnel, equipment, and resources that can be sealed off by conventional munitions if their positions can be pinpointed. These vulnerabilities can be exploited with accurate intelligence; specialized delivery systems; tailored munitions; and when possible, special forces on the ground at the critical sites. The United States is, as it should be, working on important projects to achieve gains in the effectiveness of tactics such as these. It is not necessary to destroy hardened underground targets physically by crushing them with large nuclear blasts in order to defeat them as a threat.

It is not necessary to destroy hardened underground targets physically by crushing them with large nuclear blasts in order to defeat them as a threat.

Given enormous U.S. intelligence and conventional military assets, not to mention its great relative strength, is there a credible military case for RNEP? Recognizing existing U.S. military capabilities, including high-yield nuclear warheads, and the likely harmful impact of such an initiative by the world's only superpower on international efforts to preserve and strengthen the nonproliferation regime, the additional capabilities of new nuclear bunker-buster weapons are not worth the high costs.

SECTION 5

Including Other Nuclear-Weapon States

We suggested above that a significant buildup of China's strategic nuclear forces could adversely affect the builddown that Russia and the United States should carry out in the next few years. The broader point is that each of the *de jure* and *de facto* nuclear-weapon states will have to be involved in some fashion in the effort to reduce the salience of nuclear weapons in international security relations. Given the history of the U.S.-Russian relationship, it seems reasonable to assume that their reductions in operationally deployed nuclear warheads could be managed by the U.S.-Russia Consultative Group for Strategic Security and recorded by amending SORT. In the cases of other countries, unilateral decisions that, in effect, reciprocated the actions of Russia and the United States would be the most practical way of proceeding. The actions that each of the states directly involved might take are described below.

China

We suggested in *The Gravest Danger* that a U.S.-China Consultative Group for Strategic Security be established, along the lines of the U.S.-Russia group. This could be a vehicle for exchanging information concerning strategic nuclear force structures in each country. For China, a key agenda item probably would be the U.S. ballistic missile defense program, while for the United States, the Chinese ICBM modernization programs would be of interest. If both sides were convinced that their worst-case threat scenarios would probably not materialize, nuclear restraint would be easier to manage.

India and Pakistan

Both countries are already showing restraint in their nuclear programs. In the environment we are projecting, third-country threats such as China would not increase to the level where a response, in the case of India, would be required. That said, the tensions between the two countries of the subcontinent could foster a buildup of operationally deployed nuclear forces. The point here is that the reductions programs we are advocating require an effort to resolve or at least contain regional conflicts. The impact on requirements for U.S. operationally deployed warheads of a worsening situation in regional conflict situations would be minimal, as noted above. Yet, the impact on the force levels of other states, for example, China, could be more pronounced, and this could unravel the effort to reduce the salience of nuclear weapons on a global scale.

In addition to political negotiations between India and Pakistan over Kashmir, measures to improve the safety and security of Indian and Pakistani nuclear forces would have a positive effect on the regional security environment. Indian and Pakistani cooperation with other nuclear-weapon states in this regard could run afoul of the NPT, but if properly calculated, the effort should strengthen the NPT regime.

Israel

Resolving the Israeli-Palestinian conflict will be the first step in including Israel in a program to reduce the salience of nuclear weapons globally.

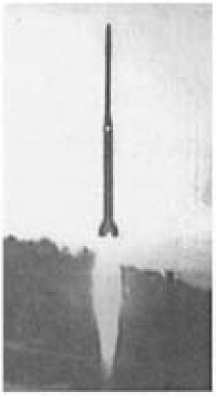
Thereafter, the most likely diplomatic track would be a resumption of discussions concerning a nuclear-weapon-free zone in the Middle East.

Iran

The current efforts by France, Germany, and the United Kingdom deserve the strong support of all other nuclear-weapon states. If these discussions prosper, it is likely that security assurances will rise eventually to the top of the agenda, and in that case, the United States will have to make a strategic decision about its future relations with Iran. Iran will have to do the same. The most immediate need would be to reassure Iran that U.S. forces in the Middle East are not a threat to its security and in fact can serve Iran's interests in that volatile region of the world.

North Korea

It may not be too late to reverse the North Korean nuclear weapons program, although the prospects for doing that are not very bright. North Korea is a key factor in decisions that other Asian states may make concerning their own nuclear weapons status. Of these, Japan is the most consequential. An overt North Korean effort to enter the ranks of the nuclear-weapon states, for example, by testing a nuclear device and flight-testing a long-range ballistic missile would have major repercussions on the Asian geopolitical scene. For that reason, efforts to engage North Korea, as in the six-party talks, are essential despite the disappointing results to date. Failing to do so or having tried and failed to reach an accommodation, the only resort will be containment, in which the United States and other regional powers should cooperate, of course, in a nonprovocative fashion. This calls for a positive program of cooperation among all of North Korea's neighbors and others, rather than mobilizing a narrowly constructed anti-North Korean alliance. As in the Middle East and South Asia, an effort to reduce the salience of nuclear weapons globally requires attention to the resolution or containment of regional conflicts.



In August 1998, North Korea surprised the United States by conducting a flight test of its Taepo Dong-1 medium-range ballistic missile. The missile's third stage failed, and North Korea has not conducted another test of a Taepo Dong-type missile since then.

The United Kingdom and France

Both countries have very capable nuclear forces and force levels that would loom larger as the United States and Russia reduced their operationally deployed nuclear warheads to the levels we believe should be possible. This suggests the United Kingdom and France would want to consider their force requirements in light of the levels that the United States and Russia are actually able to achieve. As in other cases, such as China, the mechanism to record any revised force levels would be through unilateral decisions announced in consultations with other concerned states, probably in this case meaning Russia, first and foremost.

Cooperation in Ballistic Missile Defense

If the holdings of nuclear weapons by the United States and other countries can be brought down to very low levels, an idea discussed during the Reagan presidency should be reconsidered, that of "defense dominance." In principle, there should be a crossover point in the offense-defense equation where defensive capabilities against ballistic missiles exceed the ability of an attacker to penetrate ballistic missile defenses. In Reykjavik in 1986, Reagan discussed with Soviet leader Mikhail Gorbachev a plan to zero out all U.S. and Soviet ballistic missiles and to cooperate fully in ballistic missile defenses. In doing so, Reagan was quite consciously pursuing this argument to its logical conclusion. Is it too much to think that such action may define a path leading to a world free of the curse of nuclear weapons?

We suggested in *The Gravest Danger* that international cooperation in ballistic missile defense should be a key component of a multinational coalition to combat the further spread of nuclear weapons capabilities. In an environment where total global numbers of deployed warheads on ballistic missiles are in the few hundreds, it would make sense to have a joint ballistic missile defense program among cooperating states. It would help to stabilize their own strategic nuclear relationships with each other and would link them in an effort to thwart the ambitions of noncooperating states. A cooperative program to develop an international, satellite-based early warning system against potential missile attacks could further strengthen these relationships. The principal

Pete Souza, White House

President Ronald Reagan at the Reykjavik summit in October 1986 with (left) White House chief of staff Donald T. Regan and national security adviser John M. Poindexter. At Reykjavik, Reagan and Soviet leader Mikhail Gorbachev discussed eliminating all ballistic missiles, but they failed to reach an agreement because of a dispute over U.S. missile defense efforts.

requirement for membership in this coalition would be a firm agreement that each of them will act in accordance with the prescriptions of the NPT. Bush and Putin formally agreed at Moscow in May 2002 that they would cooperate in ballistic missile defense activities, but little has been done in this regard. The sole U.S.-Russian joint missile defense project, the Russian-American Military Observation Satellite, was cancelled in 2004, and no replacement program has been launched.

SECTION 6

Why the Urgency?

Why not let well enough alone and take deeper reductions in U.S. nuclear forces after 2012? Has the matter become more urgent since a few years ago? In our view, it has. There are four factors that necessitate deeper reductions faster.

- The nonproliferation regime needs to be strengthened, and it can be by a visible effort by Russia and the United States to reduce the salience of nuclear weapons in their force postures.
- Neither Russia nor the United States will resolve their most basic national security problems through maintaining higher levels of nuclear weapons than necessary. Rather, they should focus more intently on preventing the acquisition of nuclear materials by terrorist groups, an almost certain outcome if present trends continue.
- A tipping point has been reached in Asia that could lead to a nuclear arms race there and to pressures on Russia and the United States to increase, rather than reduce, their nuclear forces.
- Budgetary pressures in Russia and in the United States indicate that, where unnecessary defense expenditures can be avoided in favor of a more rational use of resources, perhaps in other areas of defense, this should be done.

To amplify these points, first, as to the nonproliferation regime, Tenet told the Senate on March 9, 2004, that the proliferation picture "is changing before our eyes; changing at a rate I have not seen since the end of the Cold War." It is a time when the outcome of a decades-long nonproliferation effort hangs in the balance. A failure to move vigorously to maintain the nonproliferation regime could lead to a world far more dangerous than at present.

Here, it should be recalled that the nonproliferation regime consists of several layers of defenses: (1) the global norms established by the NPT, monitored by the International Atomic Energy Agency (IAEA), and supporting export control regimes put into effect through the mechanism of the NPT; (2) the post-Cold War regime established mainly through the U.S. Cooperative Threat Reduction program sponsored originally by Senators Sam Nunn (D-Ga.) and Richard Lugar (R-Ind.), and (3) the set of multinational arrangements put in place during Bush's first term, including the Global Threat Reduction Initiative, the Proliferation Security Initiative (PSI), and UN Security Council Resolution 1540, designed to strengthen national controls over fissile material. Each of these three layers of defense would be strengthened by a more dramatic

U.S. Department of Energy

"Grable" was a 15 kiloton nuclear test explosion fired on May 25, 1953 at the Nevada Test Site. The United States conducted a total of 1,032 nuclear detonations; the Soviet Union conducted 750 test explosions. A total of seven states have conducted 2,052 nuclear explosions since 1945.

U.S.-Russian turn away from reliance on nuclear weapons and a turn toward stronger support for the nonproliferation regime.

Second, the spread of nuclear technology, particularly for enriching uranium, has heightened concerns that terrorists or rogue nations will acquire nuclear weapons. Regarding U.S. and Russian security, it is generally agreed that the gravest threat they each face is at the crossroads of technology and radicalism, as Bush has put it. National resources and energy spent on supporting a higher level of strategic nuclear forces than necessary means that those national efforts are being misdirected.

Third, in North Korea, Iran, and probably China, national decisions are pending about how far to go in developing strategic offensive forces. If the battle to hold back this potential surge of nuclear buildups is lost, decisions will be made by other countries, certainly including Japan and probably, ultimately, Russia and the United States, which will restart a nuclear arms race. Over the past three decades, the nonproliferation regime has successfully staved off dire predictions that dozens of countries would arm themselves with nuclear weapons, but that nuclear nightmare could still unfold if existing nuclear-weapon states reverse their downward trend.

It is wrong-headed to place more reliance on nuclear weapons when the nation's chief priority is in preventing the further spread of these weapons.

Fourth, regarding the budgetary squeeze, the Bush administration requested for fiscal year 2006 a total budget of nearly $7 billion for funding nuclear weapons programs, an increase over the fiscal 2005 appropriations. Last year, Congress did not grant the administration's entire request, in particular for the research of earth-penetrating nuclear warheads and enhancing test site readiness. Congressional motivation in rejecting the administration's request is exactly the same as the argument being made here: it is wrong-headed to place more reliance on nuclear weapons when the nation's chief priority is in preventing the further spread of these weapons.

In Russia, overall defense spending reportedly will rise by 26 percent in 2005. The budget includes money for modernizing strategic offensive forces, among them the development of a mysterious weapon, purported to be a hypersonic cruise missile, touted by Putin. Russia is also pushing ahead with plans to field a mobile, land-based version of its Topol-M ICBM and a new sea-based ballistic missile, the Bulava.

China is accelerating its military buildup. Its 2004 budget was 11.6 percent larger than the 2003 budget, according to Tenet's report. Tenet added, "China is also moving on with its first generation of mobile strategic missiles."

Is another nuclear arms race just over the horizon? Quite possibly. Action is needed now to head it off, and not just because the results in themselves would be catastrophic. The sad and ironic fact is that these competitive efforts would do nothing to deal with the more urgent threats of nuclear terrorism and of the increasing probability that, somewhere in the world, nuclear weapons will be used in warfare. In fact, a new arms race would only make the problem worse.

For all these reasons, we judge that the urgency of getting on with deeper reductions in U.S. and Russian operationally deployed nuclear warheads is greater than the two nations' leaders thought in 2001 and 2002. Both leaders clearly envisaged deeper reductions and enshrined the idea in a solemn document they signed. Now is the time to move toward that vision.

The U.S. priority should be timely and bold actions, consistent with U.S. national security needs, to shore up international support for the nonproliferation regime. Elsewhere in *The Gravest Danger*, we have written of the need to buttress the NPT with adequate means of verifying and enforcing compliance. This includes the PSI to intercept proliferation in progress; the creation of regional centers under international control for supplying enriched uranium as fuel for power reactors and reprocessing plutonium; enhanced support for an expanded Cooperative Threat Reduction program; and the Additional Protocol allowing IAEA on-site inspections as appropriate. We have also called for economic and security guarantees as the "carrots" to accompany the enforcement "sticks" for NPT compliance. The proposal presented above sets a practical, short-term goal for nuclear force reductions that the United States could initiate jointly with Russia and that the other nuclear powers could subsequently join. We see it as enhancing the nonproliferation regime by encouraging the present nuclear-weapon states to collaborate more effectively together to roll back nuclear proliferation before it is too late.

APPENDIX 1

Cold War Thinking About Nuclear Weapons

The First Decade, 1945–54

During the first decade after the obliteration of Hiroshima and Nagasaki and following the failure of U.S.-Soviet discussions about the possibility of mutual nuclear restraint, an all-out technical-industrial race to develop nuclear weapons began. The U.S. arsenal grew rapidly, driven by advancing technology and by mounting fears of the expansionist policies of the Soviet autocrat, Joseph Stalin. Starting with only a few primitive fission bombs in 1945, the U.S. arsenal, supported by a rapidly expanding production base, exceeded 3,000 bombs by 1955.[9] These weapons were mostly aircraft-delivered gravity bombs, but some low-yield weapons were also developed for battlefield use if needed to repel a Soviet attack on Western Europe. The danger of the actual use of nuclear weapons in combat, whether in Asia or in the event of an attack on Western Europe, loomed menacingly since the early years of the Cold War, which were marked by repeated crises, including the 1948 Berlin blockade and North Korea's 1950 invasion of South Korea. The test of the first Soviet atomic bomb in 1949, followed by a Soviet buildup to an arsenal of several hundred bombs by 1955, raised tensions in an environment in which fear and suspicion were already pervasive. A wider range of military options became possible for both sides, given the growing numbers and sophistication of nuclear weapons and delivery systems.

Competition in building hydrogen bombs (two-stage fission-fusion bombs) commenced with the detonation of the initial U.S. device in 1952 and of the Russian one not long after. By the end of the first nuclear decade, 1945–1954, the United Kingdom also had become a nuclear-weapon state.

The Second Decade, 1955–64

During the second decade of the nuclear era, the buildup of nuclear arsenals accelerated. The Soviet Union launched Sputnik, the first earth-orbiting satellite, in 1957, signaling the advent of the age of ICBMs. Soon, the two superpowers could deliver hydrogen bombs anywhere in the world within about 30 minutes. Fears of a devastating surprise attack haunted military planners and political leaders. The response was not to rid the world of these weapons but rather to make them more survivable. France (1959) and China (1964) joined the United States, the Soviet Union, and the United Kingdom as nuclear-weapon states. The size of the world's nuclear arsenals ballooned from slightly more than 3,000 in 1955 to more than 37,000 by 1965, with more than 99 percent held by the United States (approximately 31,000) and the Soviet Union (an estimated 6,000). Yet, also in this period, serious diplomatic discourse and formal negotiations between the West and the Soviet Union were resumed, after a lapse of several years, to address the risks of nuclear weapons. These risks included not only their use in combat, but also the environmental and health hazards created by nuclear fallout from test explosions and the spread of nuclear weapons to other countries. The question "What are nuclear weapons for?" was broadened to include:

- How can choices in force structure reduce the risk of pre-emptive use of these weapons in combat?
- Through diplomatic means, can we make a start in containing the dangers of an unrestrained arms race, of radioactive fallout, and of proliferation of nuclear weapons?

In practice, as can be seen from the numbers above, the fear of surprise nuclear attack did next to nothing to limit the overall magnitude of the buildup of U.S. and Soviet nuclear forces. In fact, it spurred the buildup. The enormous growth during this decade was driven not only by political forces reacting to the strategic dangers on the world scene, but also by the irresistible lure of technology—multiple warheads on a single missile and much greater accuracy, for example—which opened doors for new missions for nuclear weapons. It was a matter of worst-case threat analysis feeding the most optimistic technical projections.

---

[9] This and the following estimates of force levels are taken from R.S. Norris and T.B. Cochran, *Nuclear Weapons Databook: U.S.-U.S.S.R./Russian Strategic Offensive Nuclear Forces,* 1945–96. (Washington, D.C.: Natural Resources Defense Council, January 1997).

Mounting fears about nuclear war were driven during this period by a number of events: the Soviet repression of the 1956 Hungarian uprising, the 1957 Soviet launch of Sputnik, the 1961 construction of the Berlin Wall, and the test of the Soviet Union's largest nuclear device that same year. The 1962 Cuban missile crisis appeared to give confirmation to the inevitability of nuclear catastrophe.

Of key importance for the United States in those circumstances was the survivability of its deterrent forces. This problem was managed by deploying a broad array of retaliatory systems to ensure a capacity for inflicting massive and unacceptable destruction in response to any pre-emptive first strike by an enemy. This force included the B-52 bombers that could take off under severe threat conditions and be recalled if desired; a land-based ICBM force in hardened underground silos that could be destroyed only by weapons targeted and delivered with precise accuracy and little, if any, warning; and a mobile naval force of nuclear-powered Polaris submarines with prolonged underwater endurance that could sail undetected and thus were invulnerable to a potential first strike. The U.S. strategic triad was put in place during this decade. It remains in place today.

The stated U.S. force mission was not pre-emption, but deterrence by threat of nuclear retaliation. It was to convince the Soviet Union that, no matter how successful a nuclear attack on the United States and its forces might be, U.S. retaliatory capability would inflict unacceptable devastation on the attacker. The Soviet Union made similar claims about its intentions and forces, but it was increasingly difficult for either side to accept such assurances at face value.

So, it had become politically important to moderate and, if possible, dispel fears of nuclear pre-emption. Otherwise, those fears would drive out all possibility of finding a cooperative solution to the nuclear dilemma and become a self-fulfilling prophesy. As early as 1956, the creation and deployment of thermonuclear weapons led Eisenhower to remark, "We are rapidly getting to the point that no war can be won." He added that conventional wars can be fought to exhaustion and surrender, but nuclear war can come close to "destruction of the enemy and suicide." In this spirit, Eisenhower led an effort to initiate a broad dialogue on nuclear dangers and also peaceful benefits, with the 1955 Atoms for Peace Conference and the 1956 creation of the IAEA.

Additional diplomatic initiatives to limit the explosive testing of nuclear weapons were pursued at a disarmament conference in London in 1957. Following the 1962 Cuban missile crisis, President John F. Kennedy stepped up efforts to achieve a treaty banning nuclear weapons testing. This succeeded in part in 1963 with a limited treaty ruling out all tests except those conducted underground.

A technical effort had been initiated earlier, under Eisenhower and starting with the U-2 flights, to penetrate the Iron Curtain by photo and electronic reconnaissance from space to gauge the growing threats better, without either under- or overestimating them. Eventually, this made it possible to begin the negotiation of subsequent strategic nuclear arms agreements with verifiable limits on offensive nuclear deployments.

Throughout this decade, there was a growing appreciation that the only rational mission for nuclear weapons was for a second-strike retaliation as a way of deterring potential enemy attack. In the Kennedy administration, U.S. doctrine began to emphasize conventional arms buildups as the more realistic alternative response to threats. Kennedy graphically expressed the dangers nuclear arsenals posed to survival on June 10, 1963:

> Total war makes no sense in an age when great powers can maintain large and relatively invulnerable nuclear forces and refuse to surrender without resort to those forces. It makes no sense in an age when a single nuclear weapon contains almost ten times the explosive force delivered by all of the Allied air forces in the Second World War. It makes no sense in an age when the deadly poisons produced by a nuclear exchange would be carried by wind and water and soil and seed to the far corners of the globe and to generations yet unborn.

The Third Decade, 1965–74

During the third decade of the nuclear era, the concept of deterrence by mutual assured destruction was elaborated, with added nuances and requirements. With improving accuracy of missiles and the variety of reliable nuclear warheads being deployed, both nations started developing strike forces with counterforce capability against hardened military and industrial targets. Technology inspired scenarios of controlled strikes, that is, limited attacks by nuclear weapons as opposed to an all-out massive strike, and protracted nuclear war. It also inspired concerns that the advantages of a first strike might tempt an opponent to attack in order to end up "relatively better off" in the nuclear rubble. War-fighting doctrines replaced simple massive retaliation threats as the best means of sustaining nuclear deterrence.

Technological advances in weaponry were accompanied by broadening diplomatic efforts to try to cap the nuclear arms competition. Two new nations, India and presumably Israel, became *de facto* nuclear-weapon states during this period, and concerns about proliferation led to the negotiation of the NPT, which entered into force in 1970. This treaty became the cornerstone of a worldwide effort to freeze the number of nuclear-weapon states. As expressed in the preamble to the NPT and in Article VI of that treaty, the original five nuclear-weapon states were committed to efforts to reduce the nuclear arms competition and eventually to eliminate nuclear weapons.

The rate of growth in the total numbers of nuclear weapons slowed somewhat during this period. The total inventories of the two superpowers reached 47,000, comprising more than 98 percent of the world's total. While the estimated U.S. total decreased slightly to 27,000, the Soviet Union's arsenal increased to 20,000. As the U.S. and Soviet numbers of nuclear weapons converged, their negotiations focused on limiting those forces directly threatening each other's homeland. These negotiations became known as the Strategic Arms Limitation Talks (SALT). The advent of multiple independently targetable re-entry vehicles (MIRVs), which enabled single missiles to deliver multiple warheads with precision against separate targets, complicated the SALT negotiations.

A first strike by MIRVed ICBMs targeted against the silos of an opponent's ICBM force could destroy many more missiles than used in the attack. This ratio would thereby give an advantage to the first attacker by seriously diminishing the opponent's retaliatory force. MIRVing had the result of significantly increasing the total number of warheads and opened up the possibility of targeting a broader array of industrial sites and military installations. Yet, negotiations failed to limit MIRVing. New targets were added to an already long list in the war plans. The increasing accuracy of missiles made counterforce a more attractive strategic option. Post-war recovery of the enemy also became a consideration for targeteers.

MIRVing pointed to a conclusion that it would be more important for arms control agreements to focus on limiting warheads rather than delivery systems. However, the technology of photoreconnaissance satellites circling the earth in space could not count the individual warheads, and the state of U.S.-Soviet relations was such that direct inspection of the delivery vehicles was unacceptable. Therefore, the arms control talks focused on limiting the number of long-range bombers and missile launchers for nuclear weapons.

Ballistic missile defense had been under study in the United States since shortly after World War II. The first major U.S. effort to deploy some defenses against a nuclear attack commenced in the last years of President Lyndon B. Johnson's administration and, before that, in the Soviet Union. Subsequently, the ABM Treaty was concluded in 1972 as part of the SALT negotiations. It recognized the limits of technology in providing such a defense but allowed for thin system deployments, more for cosmetic than real military purpose. In the United States, these deployments were eventually dismantled, being of little or no value. At the same time, the United States and the Soviet Union signed an Interim Agreement to limit their number of deployed ICBMs and submarine-launched ballistic missiles as well as their modernization programs. The treaty also recognized the legitimacy of verifying treaty compliance using national technical means (i.e., satellites in earth-circling orbits).

Despite these successes, the two superpowers remained poised eyeball to eyeball, with their nuclear pistols cocked. Mutual assured destruction, a phrase popularized by McNamara, continued to be accepted as an inescapable condition of the nuclear age. Nuclear weapons were not used in the bitter war in Vietnam, just as they had not been used earlier in Korea. This extended the tradition of non-use, even in otherwise unwinnable conflicts.

The Fourth Decade, 1975–84

The fourth decade of the nuclear era was a period in which force modernization continued apace and the size of the Soviet nuclear weapons stockpile almost doubled to approximately 39,000 while the U.S. force shrank slightly to 23,000 warheads. The two superpowers continued to possess more than 98 percent of all the nuclear weapons in the world and the nuclear club was enlarged, surreptitiously, by only one nation, South Africa. After the ABM Treaty and two strategic offensive arms limitation treaties, SALT I and SALT II, little negotiating progress was made with the Soviet Union under several years of transitional leaders in the Kremlin and as anti-détente attitude hardened in the United States. President Jimmy Carter withdrew SALT II from Senate consideration following the 1979 Soviet invasion of Afghanistan.

Soviet deployment of MIRVed SS-20 missiles, designed to target Western Europe, led to countermeasures by NATO in the form of intermediate-range nuclear forces. The decision to deploy these forces, made by NATO in 1979, was implemented in 1983 after a failed negotiation to limit such deployments on both sides.

When Reagan took office in 1981, he proposed that the total number of nuclear warheads should be reduced rather than simply capped at higher levels. Later, in 1983, he launched perhaps the most contentious and potentially significant initiative in this decade: the proposal to build a missile defense shield, despite the ABM Treaty's prohibitions, in an effort to break out of the doctrine of mutual assured destruction by providing significant protection against ballistic missile attack.

The Fifth Decade, 1985–94

In the fifth decade of the nuclear era, fundamental political developments took place in relations between the United States and the Soviet Union. With the rise of Gorbachev and the development of a productive relationship between him and Reagan, a number of assumptions about the threat were swept away on both sides. In the aftermath of the deadly 1986 accident at the Soviet nuclear reactor in Chernobyl, worldwide concern about the dangers of nuclear conflict were heightened significantly, especially in the Soviet Union.

At the landmark October 1986 meeting between Reagan and Gorbachev in Reykjavik, the two leaders discussed the elimination of all ballistic missile systems. Stymied by differences on what limits to put on ABM research and development, they settled for progress in the negotiations to ban all intermediate-range ballistic missiles. This culminated in a treaty which they signed in 1987 to eliminate all such ground-launched missiles from U.S. and Soviet arsenals. Beyond that, the impulse given to nuclear reductions at Reykjavik led to enough progress in the strategic arms reduction talks (START) thereafter that an agreement was within reach by 1989 when George H. W. Bush took office. Bush and Gorbachev signed the START I treaty in July 1991. This treaty, for the first time, called for major reductions in the number of accountable strategic nuclear warheads and for a ceiling on such warheads of 6,000 for each country. This progress was based on procedures allowing on-site inspection that made verifying limits on numbers of warheads for each type of missile and aircraft possible. Further progress in negotiations between Bush and Yeltsin led to agreement on deeper cuts in strategic forces, to 3,000–3,500, formalized with the January 1993 signing of START II. This treaty never entered into force, however, even after modification by Clinton and Yeltsin in 1997 to accommodate some practical Russian concerns about the pace of reductions. Moscow announced that it would no longer consider itself bound by its START II signature following the U.S. withdrawal from the ABM Treaty in June 2002. The Kremlin's act was largely symbolic given the conclusion of SORT a month earlier.

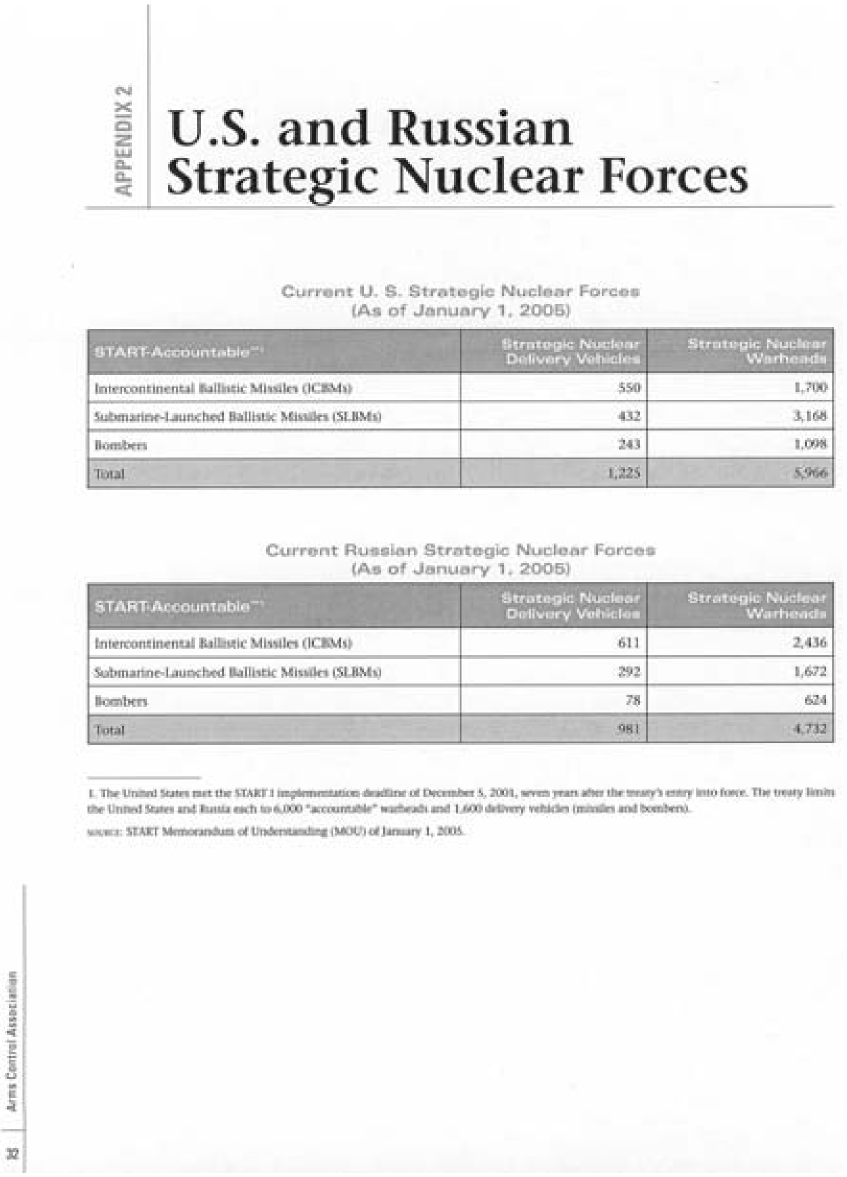
Shortly before the collapse of the Soviet Union in 1991, Bush and Gorbachev also agreed to reciprocal unilateral steps to reduce their tactical nuclear weapon systems. In 1992, beginning with the unilateral declaration by Bush of a moratorium on underground nuclear explosive testing in response to congressional pressure, the path to negotiations on a lasting ban on all nuclear testing was opened. These developments played an effective role in the 1995 indefinite extension of the NPT.

By the end of this fifth decade of the nuclear era in 1994, there had been a drop of roughly one-third in the total nuclear forces in the world, with the U.S. number dropping to slightly less than 15,000 and Russia reducing to approximately 27,000. This decade ended with no net increase in the number of nuclear-weapon states, but the group was joined by Pakistan, while South Africa gave up its nuclear weapons. Also during this period, Ukraine, Kazakhstan, and Belarus, which had become *de facto* nuclear-weapon states upon the dissolution of the Soviet Union, renounced any nuclear ambitions and returned nuclear warheads stationed on their soil to Russia.

This era marked significant progress in the rethinking of the purpose of nuclear weapons. Renewed consideration was given to certain questions.

- How many nuclear weapons are enough?
- What is the remaining mission for nuclear weapons after the Cold War?
- How can the concerns of non-nuclear-weapon countries about the discriminatory nature of the nonproliferation regime be met?

The fact of mutual assured destruction as a basis for nuclear deterrence between the United States and Russia remained long after the collapse of the Soviet Union. Eventually, new thinking challenged the notions of deterrence based upon mutual assured destruction, and with this came a realization that the high levels of nuclear weapons that still existed could not be justified.



APPENDIX 2

U.S. and Russian Strategic Nuclear Forces

Current U. S. Strategic Nuclear Forces (As of January 1, 2005)

START-Accountable[1]	Strategic Nuclear Delivery Vehicles	Strategic Nuclear Warheads
Intercontinental Ballistic Missiles (ICBMs)	550	1,700
Submarine-Launched Ballistic Missiles (SLBMs)	432	3,168
Bombers	243	1,098
Total	1,225	5,966

Current Russian Strategic Nuclear Forces (As of January 1, 2005)

START-Accountable[1]	Strategic Nuclear Delivery Vehicles	Strategic Nuclear Warheads
Intercontinental Ballistic Missiles (ICBMs)	611	2,436
Submarine-Launched Ballistic Missiles (SLBMs)	292	1,672
Bombers	78	624
Total	981	4,732

---

1. The United States met the START I implementation deadline of December 5, 2001, seven years after the treaty's entry into force. The treaty limits the United States and Russia each to 6,000 "accountable" warheads and 1,600 delivery vehicles (missiles and bombers).

SOURCE: START Memorandum of Understanding (MOU) of January 1, 2005.

The Arms Control Association (ACA), founded in 1971, is a national nonpartisan membership organization dedicated to promoting public understanding of and support for effective arms control policies. Through its public education and media programs and its magazine, *Arms Control Today (ACT),* ACA provides policy-makers, the press and the interested public with authoritative information, analysis and commentary on arms control proposals, negotiations and agreements, and related national security issues. In addition to the regular press briefings ACA holds on major arms control developments, the Association's staff provides commentary and analysis on a broad spectrum of issues for journalists and scholars both in the United States and abroad.

Arms Control Association
1150 Connecticut Avenue, NW, Suite 620
Washington, DC 20036
202-463-8270 • fax: 202-463-8273
www.armscontrol.org

Senator BILL NELSON. Thank you, Dr. Drell.

Dr. Payne?

STATEMENT OF KEITH B. PAYNE, PROFESSOR AND DEPARTMENT HEAD, GRADUATE DEPARTMENT OF DEFENSE AND STRATEGIC STUDIES, MISSOURI STATE UNIVERSITY

Dr. PAYNE. Thank you, Mr. Chairman. It's a privilege to be here this morning, and I thank you for the invitation to speak here.

I'm happy to shorten my prepared statement and enter the full statement for the record.

Senator BILL NELSON. Yes, all of the statements are entered in the record, so, if you would just talk to us, that would be great.

Dr. PAYNE. Thank you, Mr. Chairman.

Senator BILL NELSON. Thank you.

Dr. PAYNE. During the Cold War, deterrence was typically considered an easy matter, posing a nuclear retaliatory threat to the Soviet Union and Soviet targets. Unfortunately, today, most of what we believed we knew about deterrence during the Cold War is of extremely limited value.

Today, there are no certainties about deterrence. Our traditional deterrent may not work against opponents who are willing martyrs, desperate gamblers, incommunicado, miscalculating, or self-destructive. The painful contemporary truth, I'm sorry to say, is that confident assertions about how deterrence will work, and how many forces will ensure deterrence, are guesses. No one knows whether, or how, deterrence is going to work across the spectrum of opponents we now face and the spectrum of contexts in which we now want to deter.

That particular conclusion doesn't suggest that we discard deterrence. Far from it. It does, nevertheless, explain why our deterrence focus needs to change from that of the Cold War with regard to: to whom is our deterrent directed, how do we deter, and with what do we try to deter?

In some cases, nonmilitary options may be best for deterrence. In other cases, conventional, or even nuclear, threats may be necessary for deterrence. In some cases, we may simply have opponents, or confront components, who are beyond deterrence, whatever capability we might bring to the table.

To understand which is the case, we need, first, to understand the opponent's mindset and behavioral style. I believe that deterrence now, in this post-Cold War era, is, first and foremost, a matter of intelligence. It requires a much more focused and dedicated intelligence effort for this purpose than was typical in the past. There is simply no substitute now for trying to understand the specific hows and whys of opponents' decisionmaking. That's true whether the opponent is a state leadership or the leadership of a terrorist organization.

With regard to the deterrence of terrorists—this is an important new topic—let me note that I strongly disagree with the common notion that all terrorists are undeterrable. The historical record on terrorists, anarchists, and other extremist groups is sufficient for us to conclude that they may be deterrable, depending on the context and circumstances. That's all we can say about state leaderships, as well.

What are the implications of this new uncertainty of deterrence in the post-cold-war period? First, I think, and foremost, is that defensive capabilities—the ability to limit damage to the United States, our allies, our friends, and our forces—takes on a much higher priority. Why? Simply because we can no longer rely on deterrence working reliably to provide that protection. A popular line during the Cold War was that defenses are unnecessary and useless, because our "assured destruction" capability would provide deterrence and perfect protection. It needs to be recognized now, in the post-Cold War period, that deterrence can, and probably will at some point, fail unpredictably, and our only option in that case will be to defend, as well as possible, our society, our forces, our friends, and our allies. This is why I believe that various forms of strategic defensive capability, particularly against weapons of mass destruction, have become such an important priority, more so than during the Cold War.

The Bush administration's 2001 NPR sought to assess how the dramatic geopolitical changes since the Cold War should transform how we think and how we practice deterrence. I've included, for the record, a short article on the goals of the NPR, which, I'm sorry to say, still remains widely misunderstood. But with regard to nuclear weapons, the NPR concluded that they, in fact, remain essential to any prudent approach to deterrence, but that nuclear weapons alone are unsuited for many of the type of deterrence contingencies that we are going to confront in the 21st century. Having a broader array of deterrent threats, particularly including non-nuclear capabilities, should better enable us to adapt our deterrence to a whole range of different opponents and contexts. Consequently, one of the thrusts of the NPR was to reduce our reliance on nuclear weapons and to place greater reliance and emphasis on non-nuclear capabilities.

The NPR also concluded that the immediate requirement for U.S. nuclear weapons could be met with far fewer deployed nuclear forces, and that the requirement for deployed nuclear forces may recede further as our advanced conventional forces mature and as our defenses mature. That conclusion, by the way, was a basis for the deep reductions of the 2002 Moscow Treaty.

The NPR also focused on the need to assure allies, particularly through the extended U.S. nuclear umbrella. Most recently, some very close allies have openly questioned whether the longstanding U.S. "nuclear umbrella" commitment for their security remains credible and viable. A 2006 study, for example, led by former Japanese Prime Minister Nakasone, concluded that Japan should study the nuclear issue to be prepared in the event of tremendous future change. Former Prime Minister Yasuhiro Nakasone noted that Japanese security is dependent on U.S. nuclear weapons, and that the future of the U.S. extended nuclear deterrent is uncertain. Such Japanese concerns are obviously understandable given the North Korean nuclear and missile programs. I should note that allies and friends in the Middle East are expressing similar concerns as Iran moves towards a nuclear capability and expands its missile arsenal.

What's the implication of that set of circumstances? What's the significance of that? Well, first, it's to note that our extended nuclear deterrent is perhaps the most important, and the least recognized nuclear nonproliferation tool in existence. To risk understatement, nuclear proliferation will accelerate dramatically if our close allies continue to lose confidence in the U.S. extended nuclear guarantee. This point has been made explicit by Japanese officials in recent conversations.

As various nuclear reduction and disarmament proposals emerge, I think we need to be conscious of this continuing importance of our nuclear forces for extended nuclear deterrence and, in effect, for nonproliferation.

There are three contemporary strategic programs that I believe are particularly important for the future of deterrence, extended deterrence, and the assurance of U.S. allies. Let me briefly mention these. One is the RRW, which Dr. Drell has mentioned already. The second program, or set of programs, are strategic and regional ballistic missile defense capabilities. The third is a new capability for non-nuclear prompt global strike.

The RRW Program is intended to provide safety and security improvements in the nuclear arsenal, provide the potential for long-term increased confidence without nuclear testing, cost savings, the potential for long-term cost savings, and to sustain the U.S. nuclear, technical, and engineering communities.

Let me add that there is some urgency with regard to this particular program because as we look at the retirement rate for people who have been involved in the design of nuclear weapons, it's estimated that the vast majority of them will have retired within the next 5 years. If we want to be able to have that group of experienced weapon designers offer their experience to a new cadre, a new generation, of weapon designers, we need to move forward in this program, I think, speedily.

The RRW will also support the U.S. extended nuclear deterrent, and, thus, our nonproliferation goals, by helping to sustain the confidence that our allies have had in our nuclear umbrella.

Also, second, in the era of deterrence uncertainty, strategic and regional ballistic missile defense are important for our own protection and for the assurance of our allies and friends who are subject to these emerging nuclear threats and missile threats.

During the Cold War, many considered ballistic missile defense and deterrence to be mutually incompatible. Now they are fully compatible, and continued support, particularly for sea-based defenses, the multiple kill vehicle program, and a new third site in Europe, I believe to be very important.

Finally, progress toward a non-nuclear strategic capability for prompt global strike has been slow, and, in general, progress towards non-nuclear strategic capabilities has been slow. At this point, the only U.S. global strike option now available is nuclear. The U.S. capability to strike with non-nuclear forces against high-value or fleeting targets is very important. I believe it would make a significant contribution to deterrence, and, again, the assurance of our allies, and also to counterproliferation.

In conclusion, there's been a significant shift away from the Cold War balance-of-terror concept and the policies that were aligned with that. That shift is important and makes sense because of the dramatically different geopolitical environment we find ourselves in. It is true that all the details of that shift have not been worked out, and its implementation is not mature. But let me note that it took us 25 years of intense debate before we came to a consensus on our Cold War strategic policies. We probably don't have 25 years of safety to reach a consensus on our post-Cold War policies. So, my final comment is that we need to move forward thoughtfully, but also quickly, towards that consensus.

Thank you, sir.

[The prepared statement of Dr. Payne follows:]

PREPARED STATEMENT BY DR. KEITH B. PAYNE

The rise of hostile rogue states, new terrorist threats, and the proliferation of weapons of mass destruction have all highlighted our continuing need to deter attack. The importance of deterrence has survived the Cold War. The fundamental question now is how to deter new threats in a new strategic environment?

During the Cold War, deterrence typically was considered a relatively easy matter of posing a nuclear retaliatory threat to Soviet targets. Many officials and commentators mechanistically equated deterrence to our "Assured Destruction" nuclear capability. We hear echoes of this today, confident claims about deterrence linked to some specific number of weapons.

Unfortunately, most of what we believed we knew about deterrence during the Cold War now is of limited value. Today, there are no certainties about deterrence. Our traditional deterrent threat may not work predictably against opponents who are willing martyrs, desperate gamblers, incommunicado, misinformed, miscalculating, self-destructive, or motivated by unalterable, intangible goals such as honor, or ideological or religious devotion.

The list of provocations and opponents we now hope to deter has expanded, and the contexts within which we hope to deter them are far more variable. But the painful contemporary truth is that confident assertions about how deterrence will operate are guesses, usually poorly informed; no one knows whether or how deterrence will work across a wide spectrum of opponents, stakes and contexts.

This conclusion does not suggest that we discard deterrence. It does, however, explain why our Cold War views of deterrence "stability" based on offensive nuclear forces must be reconsidered. Our deterrence focus now must be broadened with regard to whom, how and with what we try to deter. In some cases, non-military approaches to deterrence may be adequate, in others, conventional or nuclear threats may be necessary; and in some cases, opponents may simply be "beyond deterrence" regardless of our threats.

To understand which may be the case for any contingency, we need first to understand the opponent's mind-set and behavioral style, and the different ways opponents can perceive and respond to our deterrence threats. Deterrence now is first and foremost a matter of intelligence. It requires a much more focused, dedicated intelligence effort for this purpose than has been the case in the past. There is no substitute for understanding the specific how's and why's of opponents' decision-making; we no longer can presume to know the boundaries of their possible behavior. This is true whether we seek to deter the leadership of a rogue state or a terrorist organization.

With regard to the deterrence of terrorists, I strongly disagree with the common notion that all terrorists are undeterrable. The historical record on terrorists, anarchists, and other extremist groups is sufficient to conclude that they may be deterred, depending on the context and circumstances, which is all that can be said of state leaders.

Defensive capabilities must take on a new, higher priority when deterrence is recognized to be uncertain. Why? Because we can no longer rely on deterrence working reliably to provide protection. A popular Cold War line was that defensive capabilities were unnecessary and useless because deterrence was ensured by our "Assured Destruction" offensive nuclear threat. It should be recognized now that deterrence can fail unpredictably, and our only option may be to defend as well as possible our society, our expeditionary forces, and our allies. This is why various forms of strategic defensive capability against mass destruction weapons are now so important. President Bush's decision to deploy strategic ballistic missile defense (BMD) against limited offensive missile threats was a reflection of this shift away from the old balance of terror deterrence policy. Much more remains to be done in this regard.

The Bush administration's 2001 Nuclear Posture Review (NPR) sought to assess how the dramatic changes since the Cold War should transform how we think about deterrence. This can be seen in its emphasis on having a much broader range of deterrent threat options than we inherited from the Cold War, and having the flexibility and knowledge of opponents necessary to tailor our deterrent efforts to a range of contingencies and opponent. I have included for the record a short article on the goals of the NPR, a document that remains widely misunderstood.[1]

With regard to nuclear weapons, the NPR concluded that they remain essential in any prudent approach to deterrence; but, nuclear weapons alone may be unsuited to many of the deterrence contingencies of the 21st century. Having a broader range of threats, including non-nuclear options, should better enable us to adapt our deterrence policies to a much wider range of opponents and contexts. Consequently, a major thrust of the NPR was to reduce reliance on nuclear weapons and place greater weight on non-nuclear capabilities.

The NPR also concluded that the immediate requirement for U.S. nuclear weapons could be met with far fewer deployed nuclear forces, and that our nuclear requirements may recede further as advanced conventional weapons and defenses mature. That conclusion was a basis for the deep nuclear reductions of the 2002 Moscow Treaty.

The NPR also focused on the need to assure allies, including via the extended U.S. "nuclear umbrella." Most recently, some close allies have openly questioned whether longstanding U.S. extended deterrence guarantees remain credible. A 2006 Japanese study headed by former Prime Minister Nakasone, for example, concluded that Japan, "should study the nuclear issue to be prepared in the event of tremendous future change. . ." Mr. Nakasone noted that Japanese security is dependent on U.S. nuclear weapons, but that the future of the U.S. extended deterrent is unclear. Such Japanese concerns are understandable given North Korean nuclear and missile programs. Allies and friends in the Middle East increasingly express similar concerns as Iran moves toward a nuclear capability and expands its missile arsenal.

Immediately following North Korea's nuclear test in October 2006, Secretary of State Rice traveled to Tokyo to reaffirm the U.S. nuclear commitment to Japan. Our extended nuclear deterrent is perhaps the most important and least recognized nuclear nonproliferation tool in existence. To risk understatement, nuclear proliferation will accelerate dramatically if close allies continue to lose confidence in the U.S. extended nuclear deterrent. This point has been made explicitly in recent conversations with Japanese officials. As various nuclear disarmament proposals emerge, we need to be conscious of this continuing importance of our extended nuclear deterrent.

Despite the NPR's call for more diverse U.S. capabilities to meet the needs of a new geopolitical environment, much remains to be done. There are three contemporary strategic programs that are particularly important to deterrence, extended deterrence and the assurance of U.S. allies: these are the Reliable Replacement Warhead (RRW); strategic and regional BMD; and, a new capability for non-nuclear, prompt global strike.

The RRW Program is intended to provide safety and security improvements in the nuclear arsenal, the potential for increased long-term confidence without nuclear testing, long-term cost savings, and to sustain the U.S. nuclear technical and engineering communities. It will also support the U.S. extended nuclear deterrent and thus our nonproliferation goals by helping to sustain the confidence of our allies in our nuclear umbrella.

In an era of deterrence uncertainty, strategic and regional BMD are important for our own protection and for the assurance of key allies increasingly subject to emerging nuclear and missile threats. During the Cold War, many considered deterrence and BMD to be incompatible. Now, they are fully compatible, and continued support for our sea-based defenses, the multiple kill vehicle, and a new defensive site in Europe are particularly important.

Finally, progress toward non-nuclear strategic capabilities has been slow; the only prompt, U.S. global strike options now available are nuclear missiles. The U.S. capability to strike with non-nuclear weapons against high value or fleeting targets at global ranges could contribute significantly to deterrence, the assurance of allies, and directly to counterproliferation. I agree strongly with General Cartwright that it is important to move forward on a non-nuclear capability for prompt global strike.

In conclusion, there has been a significant shift away from the Cold War balance of terror concept consistent with a dramatically different geopolitical environment. It is true that all the details of this shift in thinking about deterrence and its implementation are not mature. But, recall that it took 25 years of intense debate before we achieved a working consensus on our Cold War strategic policies. We may not have 25 years of relative security to achieve a new working consensus this time around; we need to move forward thoughtfully and quickly.

---

[1] Keith B. Payne, "The Nuclear Posture Review: Setting the Record Straight," The Washington Quarterly, Vol. 28, No. 3 (Summer 2005), pp. 135–151.

Keith B. Payne

The Nuclear Posture Review: Setting the Record Straight

The Bush administration's 2001 Nuclear Posture Review (NPR) was a watershed event in U.S. strategic policy. Despite its title, the scope was much broader than nuclear matters. It was a strategic posture review, the Pentagon's first strategic policy initiative to depart fundamentally from a Cold War–era policy orientation focused overwhelmingly on the Soviet strategic nuclear threat, nuclear deterrence, and management of the U.S.-Soviet "balance of terror." The first post–Cold War NPR, drafted in 1994, had retained the central assumption that the primary U.S. strategic concern was managing the hostile relationship between the two great nuclear powers.[1] In contrast, the 2001 NPR set in motion far-reaching changes designed to align U.S. strategic policy with the different realities and threats of the post–Cold War security environment.

Very early in his first term, President George W. Bush emphasized that the new strategic environment, including in particular the emergence of hostile states with weapons of mass destruction (WMD) and the improvement in U.S.-Russian relations, demanded changes in strategic policy. "[W]e must seek security based on more than the grim premise that we can destroy those who seek to destroy us. This is an important opportunity for the world to rethink the unthinkable, and to find new ways to keep the peace," he said. "Deterrence can no longer be based solely on the threat of nuclear retaliation."[2] The NPR responded to this call.

Although the NPR was intended to address the dramatically different post–Cold War security conditions,[3] much of the criticism leveled against it

---

Keith B. Payne, president of the National Institute for Pubic Policy, served as deputy assistant secretary of defense from 2002 to 2003. The views expressed in this article are solely of the author and do not reflect the official policy of the Department of Defense.

The author would like to thank Robert Joseph, Tom Scheber, and Kurt Guthe for their helpful comments.

© 2005 by The Center for Strategic and International Studies and the Massachusetts Institute of Technology

The Washington Quarterly • 28:3 pp. 135–151.

has been based on criteria for strategic forces inherited from Cold War deterrence axioms, adages, and definitions. It has been claimed that the NPR rejects deterrence, blurs the distinction between conventional and nuclear forces, places greater emphasis on nuclear weapons, calls for new nuclear weapons and testing, lowers the nuclear threshold, spurs nuclear proliferation, and continues Cold War modes of force sizing. Yet, these are all errors of fact or interpretation, based on entrenched strategic maxims pertinent to a strategic environment that no longer exists.

At least some of the more vitriolic critiques of the NPR appear to be inspired less by substance than by partisan politics, including the use of nuclear fears to generate public opposition to the Bush administration. For example, during the recent presidential campaign, Dr. Helen Caldicott, founder of Physicians for Social Responsibility, offered the following decidedly partisan observation: "My prognosis is, if nothing changes and Bush is reelected, within ten or twenty years, there will be no life on the planet, or little."[4] In addition to such crude partisanship, there has undoubtedly been considerable honest misunderstanding of the NPR's substance. This article is intended to help clarify the themes of the NPR within the bounds of appropriate public discussion of a document that remains classified.

Enhancing Deterrence, Not War Fighting

A frequently expressed but nonetheless wholly mistaken assessment of the NPR is that it rejects deterrence in favor of nuclear war fighting. For example, Ivo Daalder observed that, "[t]hroughout the nuclear age, the fundamental goal has been to prevent the use of nuclear weapons. Now the policy has been turned upside down. It is to keep nuclear weapons as a tool of war-fighting rather than a tool of deterrence."[5] Actually abandoning deterrence as a U.S. strategic goal would have been more than a dramatic shift in U.S. strategic policy; it would have been a profound mistake. The NPR, however, did no such thing. This is not a matter of interpretation. In extensive open testimony on the NPR, Undersecretary of Defense Doug Feith, Assistant Secretary of Defense J. D. Crouch, and Administrator of the National Nuclear Security Administration John Gordon all described deterrence throughout their respective remarks as a fundamental goal of U.S. strategic policy.[6] Secretary of Defense Donald Rumsfeld's unclassified foreword to the NPR emphasizes that much of the NPR's policy direction is designed to "improve our ability to deter attack" while reducing "our dependence on nuclear weapons" to deter.

Rather than rejecting deterrence, the NPR emphasized the importance of improving it to counter post–Cold War security threats, including in particular those posed by WMD proliferation.[7] The NPR addressed the fundamental challenge in this regard: the circumstances of the contemporary security environment introduce even greater uncertainties into the functioning of deterrence than existed during the Cold War, undermining its predictability and reliability. Recognizing this uncertainty marks a significant shift in perspective regarding U.S. strategic policy, with far-reaching implications.

During the Cold War, the balance of nuclear terror and its promise of mutual destruction were widely believed to ensure the predictable, reliable functioning of deterrence against any sane Soviet leadership. President John F. Kennedy's national security adviser, McGeorge Bundy, reflected this overwhelming confidence in deterrence in his seminal 1969 *Foreign Affairs* article. He wrote that, "[i]n the light of the certain prospect of retaliation there has been literally no chance at all that any sane political authority, in either the United States or the Soviet Union, would consciously choose to start a nuclear war. This proposition is true for the past, the present, and the foreseeable future. For sane men on both sides, the balance of terror is overwhelmingly persuasive."[8] Bundy believed that the mutual fear of nuclear destruction was so powerful that nuclear deterrence had become existential and that any residual uncertainty about rational behavior served to buttress the reliable functioning of deterrence.[9] Under this rubric, mutual societal vulnerability to nuclear attack was seen not simply as a regrettable condition, but as the guarantee of deterrence stability.

Much of the criticism leveled against the NPR has been based on Cold War criteria.

Because the nuclear balance of terror was believed essentially to guarantee the reliable functioning of deterrence, the only material strategic policy question remaining was how to manage that balance to preserve deterrence stability. The Cold War answer became enshrined as the very definition of how to practice strategic deterrence: maintain a massive nuclear retaliatory capability, but eschew strategic offensive or defensive capabilities that could destabilize the balance of terror by limiting the damage that might result from a superpower nuclear exchange. Such capabilities included ballistic missile defenses (BMD) that might defend against launched missiles and accurate intercontinental ballistic missile (ICBM) warheads that might comprehensively threaten the opponent's missiles in their silos.

In a deterrence concept where stability came from mutual societal vulnerability and a balance of terror, these types of forces were deemed destabilizing. They were categorized as being for war-fighting purposes vice deterrence because they threatened to undercut that fundamental vulnerability. These Cold

War definitions became powerful tools by which to measure the deterrent effect of strategic forces. Based on these categorizations, government agencies endeavored to conduct "stability impact" studies of prospective strategic forces. Organizing forces into such categories—deterrence/stabilizing or war fighting/destabilizing—was a Cold War, balance-of-terror construct with little meaning outside of that context. Nevertheless, these categories remain entrenched in popular discussions of the subject as terms of art and as the measures of merit for strategic forces.

The Significance of Uncertainty

The 2001 NPR emphasized that, in the post–Cold War security environment, the balance of nuclear terror is not an adequate basis for strategic policy and the uncertainties surrounding deterrence undermine its predictable functioning.[10] This conclusion was central to the NPR's subsequent logic and guidance. The basis for concluding that the predictability of deterrence has suffered in the post–Cold War era is not predicated on the presumption that rogue leaders are inherently irrational, as some have alleged.[11] Although the road to power in rogue regimes can be brutal and instill or reinforce a propensity for risk-taking, true irrationality and delusional behavior appear relatively infrequently in state leaders.[12]

Rationality in decisionmaking, however, is not the only necessary condition for deterrence to function predictably and reliably. Rather, a demanding set of additional conditions must be in place, including an opponent who is well informed, makes decisions based on broadly identifiable cost-benefit calculations, values that which the United States can threaten, and ultimately is cautious in the face of that threat. Predictable deterrence also requires mutual familiarity, understanding, and even empathy, as well as reliable, reasonably accurate channels of communications.[13]

These characteristics essentially were assumed to be sufficiently in place vis-à-vis Moscow during the Cold War for deterrence to function predictably and even existentially. This assumption was optimistic, even in the case of U.S.-Soviet relations. In the case of U.S. relations with diverse rogue states, the demanding conditions necessary for deterrence cannot reasonably be assumed to pertain on a continuing basis. The United States can no longer take comfort in the Cold War belief that opponents will be deterred reliably and in predictable ways.[14]

The threat of widespread nuclear destruction, for example, may have reliably deterred the Soviet Union, and the United States will continue to have the capability to pose extremely lethal threats to many targets. One cannot assume with confidence, however, that such threats will deter contemporary adversaries in all cases. Avoiding threats to material values and physical targets frequently has not been the highest motivation in opponents' past decisionmaking, and the same is likely to be true in at least some post–Cold War contingencies. U.S. military threats simply may not be applicable to what an opponent values most, particularly when an opponent's primary motivations are intangible.

Yale professor Donald Kagan's unparalleled survey of the origins of war across centuries demonstrates how often extreme risk-taking is accepted in the service of intangible goals such as honor.[15] What does this mean for deterrence and high-stakes decisionmaking? Kagan answers that, "[o]n countless occasions states have acted to defend or foster a collection of beliefs and feelings that ran counter to their practical interests and have placed their security at risk, persisting in their course even when the costs were high and the danger evident."[16] Although such decisions may appear irrational to a secular, Western pragmatist, they are most likely rational but driven by a value structure unfamiliar and even unimaginable to the Western observer.

The NPR did not abandon deterrence in favor of war fighting.

Examples of decisions in which intangible or unimaginable goals outweigh reasonable caution abound, even in the face of explicit or potential nuclear threats. In 1945, Japanese war minister Korechiki Anami wanted to continue fighting following the first atomic attack, preferring to accept national destruction to the dishonor of surrender. In 1962, during the missile crisis, the Cuban leadership actually sought a nuclear war in the apparent belief that socialism would triumph amid the ruin. Two decades later, Leopoldo Galtieri led Argentina's military junta to invade and occupy the United Kingdom's Falkland Islands, reasonably confident in the mistaken belief that the United Kingdom, a nuclear power, would not respond forcefully. In his explanation of Argentina's stance to Secretary of State Alexander Haig, Galtieri said, "We cannot sacrifice our honor.... You will understand that the Argentinean government has to look good, too."[17] Each of these positions reflected an extreme sense of honor, or mission, or the mixture of ignorance, poor judgment, and folly all too commonplace in international relations. The Cold War's balance of nuclear terror model of deterrence did not take this dynamic, which can lead to the unexpected failure of deterrence, into account other than to posit with blinding chutzpah and historical naivete that it cannot happen if leaders are sane.

In the post–Cold War era, rogue leaders may well be fully rational, but deterrence will remain uncertain because it cannot reliably be predicted how those leaders will calculate goals, values, risk, and caution; interpretations of reasonableness for those qualities vary across time, place, and culture. Yet, the ability of U.S. leaders to structure and communicate a U.S. deterrent effectively depends on whether they understand how the opponent interprets what is reasonable. As proliferation places WMD in multiple rogues' hands, the uncertainties surrounding the reliable functioning of deterrence assume greater importance. A single failure of deterrence against even a second-rate WMD power could lead to intolerable levels of destruction. The comforting belief that deterrence can be made to function reliably and predictably is no longer a reasonable basis around which to build strategic policy or define strategic forces.

Deemphasizing Nuclear Weapons

Rather than rejecting deterrence in the circumstances of greater uncertainty, as has been charged, the 2001 NPR emphasizes the need to strengthen deterrence and to provide protection against attack in the event deterrence fails.[18] In his open discussion of the NPR, Undersecretary Feith emphasized the new uncertainties and the consequent need to strengthen deterrence. He said, "The continuities of the past U.S.-Soviet relationship have been replaced by the unpredictability of potential opponents who are motivated by goals and values we often do not share nor well understand, and who move in directions we may not anticipate ... brutal leaders who have few institutional or moral constraints and are motivated by an extreme hatred of the Unired States and the personal freedoms and liberties we hold dear." These post–Cold War conditions do not permit confidence that "opponents will be deterred in predictable ways."[19]

The NPR identified several avenues to strengthen deterrence in this new strategic environment. For example, it pointed to the need to understand the intentions and capabilities of opponents better so that the United States can "tailor its deterrence strategies to the greatest effect."[20] Under Secretary of Defense Stephen Cambone emphasized this point in open testimony, stating that "[d]eterring future adversaries will require a detailed understanding of their goals, motivations, history, networks, relationships, and all the dimensions of human political behavior, on a scale broader and deeper than today's."[21] Improving our understanding of potential opponents cannot guarantee deterrence, but it can help reduce the prospects for first-order errors and surprises.

The NPR also emphasized the need to possess a wide spectrum of capabilities—conventional and nuclear, offensive and defensive—to support the tailoring of credible deterrence strategies better against a diverse set of potential contingencies and opponents[22] and, in the event deterrence fails, to help protect the United States and its allies and friends against attack. Secretary Rumsfeld, for example, observed that "[a]ctive and passive defenses will not be perfect. However, by denying or reducing the effectiveness of limited attacks, defenses can discourage attacks, provide new capabilities for managing crises, and provide insurance against the failure of traditional deterrence."[23] The Cold War's approach to deterring the Soviet Union simplified this problem considerably: the security threat was from a single entity; the basic solution was deterrence; the mechanism for existential deterrence was the balance of terror; and the balance of terror was built on the threat of massive, offensive nuclear retaliation. When deterrence was believed to function existentially, there was no compelling need for a defensive hedge against its failure. When the opponent was a nuclear superpower and the stakes were survival, the credibility of U.S. nuclear threats was less subject to question.

The NPR does not presume that rogue leaders are inherently irrational.

Yet, what happens when the post–Cold War opponent is a relatively unfamiliar regional power and the stakes for Washington are far less than survival? In such cases, will it be apparent if deterrence is feasible or if the opponent is willing to "risk it all" in pursuit of some intangible, possibly unimaginable goal? Might U.S. nuclear deterrence threats be insufficiently credible? Might not conventional threats be more credible and defenses contribute to a useful hedge against deterrence failure and to deterrence itself? The NPR pointed to the need for the United States to have this broader range of deterrent tools to tailor deterrence strategies better across a broad range of opponents and circumstances and to provide a defensive hedge.[24]

Subsequent political commentary grossly misinterpreted the NPR's emphasis on integrating nonnuclear and defensive capabilities in a "New Triad" of strategic forces. Critics used the logic and labels from outdated balance of terror notions to charge the NPR with abandoning deterrence, promoting war fighting, and blurring the distinction between conventional and nuclear weapons, placing greater emphasis on the latter.[25] Employing archaic Cold War categorizations and maxims and related balance of terror parlance, they assessed the NPR as promoting war fighting vice deterrence. On the assumption, for example, that deterrence remains broadly existential and an effect of societal vulnerability, critics continue to define defenses as unnecessary and incompatible with deterrence. In contrast, the NPR called for ballistic missile defense deployment to contribute to deterrence and to help provide a defensive hedge against uncertainties and the inherent possibility that deterrence could fail.

The NPR's introduction of nonnuclear forces into the strategic deterrence equation has nothing to do with rejecting deterrence in favor of war fighting or blurring the distinction between nuclear and conventional weapons. In fact, one of the underlying reasons for including nonnuclear and defensive forces in the new strategic triad is the continuing sharp and proper distinction between nuclear and conventional forces. If the United States really were to blur the distinction, that is, if it treated nuclear weapons as it did conventional weapons, the credibility of the nuclear deterrent might be less open to question. Nuclear deterrence presumably would be as credible as conventional deterrence if the United States acknowledged no distinctions. The NPR did not choose to blur those distinctions as a way to strengthen credibility. Instead, it preserved the firewalls between nuclear and conventional forces and called for a greater emphasis on advanced nonnuclear and defensive forces to help strengthen U.S. deterrence credibility against post–Cold War threats.

Enhancing Deterrence, Not Usability

An additional avenue for strengthening deterrence identified by the NPR was the possible U.S. need to "adapt its nuclear forces" to the deterrence requirements of the changing strategic environment.[26] It should not come as a surprise that the nuclear arsenal designed to deter the Soviet leadership in a balance of terror might not be best suited to deter post–Cold War threats. Accordingly, the NPR called for the capability to "modify, upgrade or replace portions of the extant nuclear force or develop concepts for follow-on nuclear weapons systems better suited to the nation's needs."[27] One potential problem with the extant nuclear arsenal, identified by Secretary Rumsfeld, is that it combines relatively modest accuracy with large warhead yields.[28] Large-yield weapons were compatible with the Cold War's balance of terror, when massive nuclear firepower was thought to be the basis for deterrence. Today, however, an arsenal of largely high-yield weapons of moderate accuracy may leave a gap in the U.S. deterrent. It may not be sufficiently credible in the eyes of some regional opponents if they believe that their provocation could sidestep the U.S. deterrent threat, given the extreme U.S. reluctance to countenance the high levels of civil destruction typically associated with large-yield weapons.

Measures that today's opponents are taking to shield their weapons and leadership could also undermine the credibility of the current U.S. deterrent. North Korea, for example, appears to have dug tunnels deep underground to escape the reach of extant U.S. nuclear weapons. In such cases, some hardened opponents might doubt the deterrent's credibility and be emboldened to aggression. The NPR pointed to the potential for low-yield, precision nuclear options and the ability to hold hard and deeply buried targets (HDBT) at risk to improve the U.S. deterrent capability and credibility under these circumstances.[29]

Some misconstrued this NPR initiative as rejecting deterrence because Cold War maxims postulated that only nuclear forces designed for holding societal targets at risk can be for deterrence, while other types of forces, particularly those designed to hold military targets at risk, are for war fighting. In the post–Cold War environment, however, nuclear capabilities capable of holding hard and deeply buried targets at risk and minimizing the threat to civilians may be critical to maintaining a credible, effective deterrent. The NPR's call to be able to adjust the U.S. force structure accordingly was not a rejection of deterrence, but an effort to help strengthen deterrence at much lower nuclear force levels and in a new strategic environment.[30] This NPR initiative did not place greater emphasis on nuclear weapons, mandate new nuclear weapons, call for nuclear testing, or reject deterrence in favor of war fighting.[31] Instead, the NPR emphasized that improved relations with Russia and expanded nonnuclear and defensive capabilities reduced U.S. reliance on nuclear weapons and provided the opportunity for prudent, deep reductions,[32] pointing for the first time to "opportunities for substituting non-nuclear strike capabilities for nuclear forces and defensive systems for offensive means."[33] The NPR concluded that the new relationship with Russia permitted the United States to reduce by approximately two-thirds the number of deployed strategic nuclear weapons[34] and that, as nonnuclear and defensive capabilities advanced, the requirement for nuclear weapons might reduce further still.[35]

Improving our understanding of potential opponents can help reduce errors and surprises.

Some have also mischaracterized the NPR's call to strengthen the credibility of the U.S. nuclear deterrent as lowering the nuclear threshold. The rationale behind this claim is that low-yield precision weapons that could limit the threat to civilians and civil structures near a target would be more "usable." As several commentators have observed, "The implication is that, if their resulting collateral damage can be substantially reduced by lowering the explosive power of the warhead, nuclear weapons would be more politically palatable and therefore more 'useable' for attacking deeply buried targets in tactical missions—even in or near urban settings, which can be the preferred locales for such targets."[36] The notion that low-yield precision weapons that could lower the threat to civilian society cannot serve deterrence purposes, but instead must lower the nuclear threshold, harkens back to the balance of terror approach to deterrence that saw stability as the product of mutual societal vulnerability. Under this theory, long-standing moral strictures for limiting the threat to civilians were subordinated to the goal of deterrence stability. In the post–Cold War era, however, when the stake at risk for the United States in a regional crisis is unlikely to be survival, the credibility of the U.S. nuclear deterrent may rest not on how much damage to the opponent's society is threatened, but rather on how little. Moral considerations and the efficacy of deterrence may now merge.

Nuclear capabilities minimizing the threat to civilians may be critical to deterrence.

In addition, this critique mistakenly conflates the perspective of the U.S. president with opponents' perspectives. The credibility of the U.S. nuclear deterrent to opponents is not synonymous with how usable the weapon appears to the U.S. president. A president's considerations regarding the actual employment of a nuclear response almost certainly would depend more on the nature and circumstances of an opponent's attack than any other factor. In fact, throughout virtually the entire course of the Cold War, from acute crises in Berlin, the Taiwan Strait, the Caribbean and the Middle East through shooting wars in Asia, when low-yield weapons were available to U.S. presidents, no evidence suggests that the availability of these weapons made any president less cautious about employing nuclear weapons.

There is no such thing as a single, objective nuclear threshold to be lowered or raised mechanistically. That notion, like others, is a construct of the Cold War's balance of terror. Today, the United States has multiple opponents with various perceptions of the U.S. nuclear threshold, and these perceptions may be far removed from actual presidential decisionmaking following a provocation. During the 1991 Persian Gulf War, for example, on the basis of expressed U.S. threats, Saddam Hussein was deterred by the belief that his use of chemical or biological weapons against coalition members would lead to a U.S. nuclear reply. Postwar memoirs and statements of the U.S. decisionmakers involved make abundantly clear, however, that the United States was not considering any use of a nuclear weapon at the time, even if Saddam had used WMD.[37] The heart of the debate is not the Cold War adage that low-yield precision weapons are militarily more usable from the president's perspective and thus more likely to be used, but that opponents may judge them to be more credible for deterrence when the stakes for the United States do not include survival. Low-yield precision weapons may help strengthen deterrence in this fashion.

The Nuclear Devaluation Myth

Another misunderstanding of the NPR's call to adapt U.S. nuclear forces to deter post–Cold War threats better concerns its potential effect on proliferation. Some critics of the NPR assert that U.S. initiatives, such as the request to examine the potential for holding hardened and deeply buried targets at risk, will accelerate nuclear proliferation. The rationale behind this assertion is that a U.S. nuclear initiative would signal to others, including North Korea and Iran, the continuing value of nuclear weapons and would spur them to proliferate. These critics claim that the United States is hypocritical to examine the potential for new nuclear capabilities while calling on North Korea and Iran to abandon their nuclear programs.[38]

This linkage of a potential U.S. nuclear initiative to the motivation of others to acquire nuclear weapons derives from the old action-reaction dynamic thought to drive the U.S.-Soviet nuclear arms competition during the Cold War. It was believed that the Soviet Union paced its nuclear forces after the U.S. lead. If Washington pursued a nuclear capability, Moscow would feel compelled to follow suit; if Washington refrained, so too would Moscow.[39] U.S. action would lead to the inevitable Soviet reaction. Contending now that U.S. nuclear efforts will motivate rogue states to seek nuclear capabilities simply recasts and applies the action-reaction thesis to contemporary opponents and proliferation.

Yet, this arms race theory was inadequate to explain U.S. or Soviet motives during the Cold War,[40] and today it mistakenly attributes the same motivation and dynamic to rogue states. Rogue states seek nuclear capabilities for their own purposes, such as the ability to intimidate or attack their regional neighbors and to deter with nuclear threats an overwhelmingly strong U.S. conventional response to such actions. These nuclear aspirations do not require rogues to mimic U.S. nuclear programs qualitatively or quantitatively, nor do they need U.S. signals to appreciate the value of nuclear weapons for their own particular purposes. North Korea and Iran, for example, see considerable value in nuclear weapons. For these states, the signal sent by Washington, were it to refrain from the potential to hold hardened and deeply buried targets at risk, would have no dampening effect on the high value they already place on nuclear weapons. In fact, it could have the opposite effect by encouraging them to believe that tunneling deep underground can effectively put them beyond the reach of the U.S. deterrent.

In reality, to the extent that any U.S. action contributes to rogue motivations to seek nuclear weapons in the post–Cold War era, it does so outside the nuclear sphere entirely, via U.S. possession of overwhelming conventional forces that rogues can hope to trump only with WMD threats. This is their only theory of victory over the United States. As former Secretary of Defense William S. Cohen observed, "A paradox of the new strategic environment is that American [conventional] military superiority actually increases the threat of nuclear, biological, or chemical attack against us by creating incentives for adversaries to challenge us asymmetrically."[41] Former Indian army Chief of Staff General K. Sundarji pointed to this dynamic in his remark following the 1991 Gulf War, that a nuclear deterrent is necessary "to dissuade big powers" and that "[t]he Gulf War emphasized again that nuclear weapons are the ultimate coin of power."[42]

Unfortunately, were the United States to eschew the advanced conventional capabilities in which it excels—and that may actually contribute to rogue nuclear incentives—it would reject the very capabilities that help to reduce its own reliance on nuclear weapons. This *reductio ad absurdum* demonstrates again how ill fitting old Cold War axioms are for the post–Cold War period.

Moreover, the NPR's emphasis on strengthening the credibility of the U.S. nuclear deterrent is not hypocritical in light of U.S. nuclear nonproliferation goals. The credibility of the U.S. nuclear deterrent is essential to nuclear nonproliferation. The United States carries special responsibilities in this regard. Its extended nuclear deterrence commitments—its nuclear umbrella—permit friends and allies to forgo seeking their own independent nuclear capabilities or alternatives. This is perhaps the single most important inhibitor of the pace of global proliferation today, particularly as countries such as North Korea and potentially Iran move to become nuclear powers. Anticipating, for example, the stark proliferation consequences were Japan to conclude that it could no longer rely on the credibility of the U.S. nuclear deterrent is not difficult. Senior Japanese commentators have stated that, if this occurred, Japan would have to find its own nuclear deterrent and protection.[43] If Japan were to move toward nuclear weapons, others in Asia would likely feel strong pressure to do the same. The NPR's call to strengthen the credibility of the U.S. nuclear deterrent is not contrary to nuclear nonproliferation efforts, it is essential to those efforts.

Calculating Force Requirements

A final common misunderstanding of the NPR is that it continued the Cold War practice of focusing on the Soviet Union—now on Russia—as the basis for determining the number of operationally deployed nuclear weapons.[44] Senior officials in the Department of Defense explicitly stated that the NPR's specified deployed force level of 1,700–2,200 warheads was not based on including Russia as an immediate threat and that a deep reduction in deployed nuclear weapons is possible because of the new U.S. strategic relationship with Russia.[45]

Critics responded that excluding the old-style targeting requirements to deter Russia should reduce the number of operationally deployed nuclear warheads retained to far fewer than 1,700–2,200 and that the cumulative nuclear targeting requirements to deter all other potential enemies combined should not lead to such a force level.[46] According to these critics, the NPR must therefore have continued to reflect Cold War–era requirement calculations and not the improved U.S.-Russian relationship that officials claim. In response, the lower force levels they propose typically appear to be based on an intuitively derived number they judge to be sufficient for deterrence. One such commentator, for example, confidently claims that "having 100 nuclear warheads and a range of military and other targets that the president might threaten to attack or might actually authorize an attack on will deter others from using nuclear, biological, or chemical weapons or from even engaging in conventional attacks."[47] These critics, however, mistakenly assume that the NPR similarly followed their Cold War mode of calculating force requirements per targets for deterrence. Consequently, they cannot reconcile, by their own calculations, the NPR's call for reductions to 1,700-2,200 deployed warheads with the new relationship with Russia.

Today, the U.S. has multiple opponents with various perceptions of the nuclear threshold.

What was the NPR's methodology for calculating force requirements? Although senior officials have publicly presented the basic elements of the calculations, the details of that answer are not fully available for public discussion. In general, the NPR's recommended force structure and number of deployed nuclear warheads was calculated to support not only the immediate requirements for deterrence, but also to contribute to the additional goals of assuring allies and friends, dissuading potential opponents from choosing the route of arms competition or military challenge, and providing a hedge against the possible emergence of more severe, future military threats or severe technical problems in the arsenal.[48] In light of limitations in the U.S. nuclear production infrastructure, maintaining such a hedge includes the need to retain the forces and force structure necessary to support the reconstitution of some nuclear capabilities if that becomes necessary. No contradiction exists between the NPR's deployed force levels and ending the Cold War practice of sizing U.S. strategic nuclear force levels against Russia as an immediate threat. Commentators who cannot get the NPR's numbers to compute are basing their calculations on the traditional Cold War formula. The NPR considers a broader set of goals, and it should not be surprising that this set of goals would generate force requirements different from those attributed to targeting requirements for immediate deterrence alone.

Keeping an Open Mind

The NPR's directions undoubtedly involve some potential trade-offs that deserve ongoing attention and consideration, and it calls for periodic assessments to provide such review.[49] One may rightly ask how necessary the NPR's initiatives are to strengthen deterrence. That question, however, has no formulaic answer, and Cold War axioms provide little insight. Ultimately, the answer depends on judgments about the risk that deterrence would otherwise fail and what the consequences of that failure might be. In considering this question, it is important to recall that perceptions of weakness can invite testing and provocation, and in an era of WMD proliferation, the consequences of even a single deterrence failure involving regional powers may be severe. In addition, some empirical evidence suggests that rogue leaders see and may seek to exploit the gap in U.S. deterrence capabilities that the NPR addresses. During the recent visit by a U.S. congressional delegation to North Korea, Representative Curt Weldon (R-Pa.) raised with senior North Korean military and political leaders the U.S. interest in a nuclear capability to hold hardened and deeply buried targets at risk. According to Weldon and other members of the delegation, this was the only U.S. military capability that the North Koreans appeared to respect or that "got their attention,"[50] suggesting its potential deterrent value.

To be sure, these and similar snippets of evidence do not prove deterrence will fail unless the United States develops low-yield weapons or the capability to hold hardened and deeply buried targets at risk. No such proof is possible for any military or political instrument. The future is not so predictable, and future deterrent effect cannot be so finely deconstructed. If the burden of proof can be met by demonstrating that potential gaps in U.S. deterrence capabilities exist, that new opponents seem to see those gaps, and that the threat these gaps could pose is serious, then moving to close those gaps now is only prudent. This is in large part what the 2001 NPR was about, including its expressed goal of adapting a much smaller nuclear arsenal to the new strategic environment.

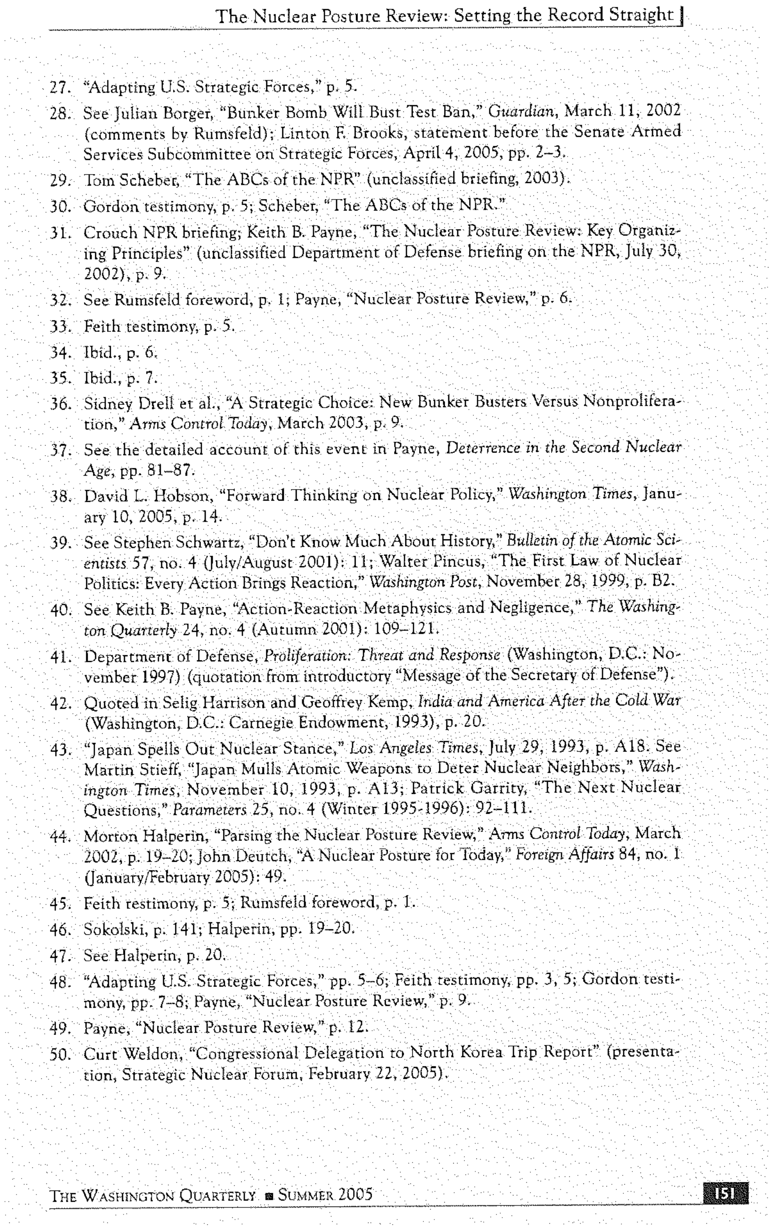
Unfortunately, popular commentary on the NPR continues to reflect misunderstanding of its basic themes. Much of this misunderstanding reflects the tendency to view the NPR through lenses colored by axioms, definitions, language, and measures of merit inherited from the Cold War and to discuss it in the related vernacular. Past and now generally outmoded maxims about what constitutes stability, the categorization of capabilities as being either for deterrence or for war fighting, the concept of lowering or raising the nuclear threshold or of sparking an action-reaction cycle, and even the formula for calculating force requirements are all constructs suited to a time that has passed, an enemy that is gone, and an approach to deterrence peculiar to the Cold War. Those constructs became so ingrained during the Cold War that they have outlived the circumstances that spawned them. The Cold War prism now significantly hinders thoughtful consideration of post–Cold War strategic questions, yet new strategic threats demand our best thought. It is time to move on.

The credibility of the U.S. nuclear deterrent is essential to nuclear nonproliferation.

Notes

1. Douglas J. Feith, statement before the Senate Armed Services Committee hearing on the Nuclear Posture Review, February 14, 2002, p. 1 (hereinafter Feith testimony).
2. Office of the Press Secretary, The White House, "Remarks by the President to Students and Faculty at National Defense University," Washington, D.C., May 1, 2001, http://www.whitehouse.gov/news/releases/2001/05/20010501-10.html.
3. "United States Department of Defense Briefing Slides," January 9, 2002, slides 4–5, http://www.defenselink.mil/news/Jan2002/g020109-D-6570C.html (special NPR briefing presented by Assistant Secretary of Defense for International Security Policy J. D. Crouch); Secretary of Defense Donald Rumsfeld, "Adapting U.S. Strategic Forces," in *Annual Report to the President and the Congress*, 2002, chap. 7, p. 1, http://www.defenselink.mil/execsec/adr2002/html_files/chap7.htm; Feith testimony, p. 2.
4. "Nuclear Weapons 'Immoral,' Say Religious, Scientific Leaders," *Los Angeles Times*, March 9, 2004.
5. Quoted in Michael Gordon, "Nuclear Arms: For Deterrence or Fighting," *New York Times*, March 11, 2002.
6. Feith testimony; "Special Briefing on the Nuclear Posture Review," January 9, 2002, http://www.defenselink.mil/transcripts/2002/t01092002_t0109npr.html (presented by Assistant Secretary of Defense for International Security Policy J. D. Crouch) (hereinafter Crouch NPR briefing); John A. Gordon, statement before the Senate Armed Services Committee, February 14, 2002 (hereinafter Gordon testimony).
7. Donald H. Rumsfeld, foreword to *Nuclear Posture Review Report*, http://www.defenselink.mil/news/Jan2002/d20020109npr.pdf (hereinafter Rumsfeld foreword).

8. McGeorge Bundy, "To Cap the Volcano," *Foreign Affairs* 48, no. 1 (October 1969): 10.
9. "The Bishops and the Bomb," *New York Review*, June 16, 1983.
10. Rumsfeld foreword, p. 2; Feith testimony, pp. 2–3.
11. See, for example, George Lewis, Lisbeth Gronland, and David Wright, "National Missile Defense: An Indefensible System," *Foreign Policy*, no. 117 (Winter 1999–2000): 128–129; Kenneth N. Waltz, "More May Be Better," in *The Spread of Nuclear Weapons: A Debate Renewed*, eds. Scott D. Sagan and Kenneth N. Waltz (New York: W. W. Norton, 2003), p. 14; Lawrence Freedman, *Deterrence* (Cambridge: Polity Press, 2004), p. 29; Stephen Walt, "Rush to Failure," *Harvard Magazine* 102, no. 5 (May–June 2000): 35.
12. See Robert Noland, "Presidential Disability and the Proposed Constitutional Amendment," *American Psychologist*, no. 21 (March 1966): 232; Jonathan Roberts, *Decision-Making During International Crises* (New York: St. Martins Press, 1988), p. 186.
13. See Robert G. Joseph, "Nuclear Deterrence and Regional Proliferators," *The Washington Quarterly* 20, no. 3 (Summer 1997): 167–175; Keith B. Payne, *Deterrence in the Second Nuclear Age* (Lexington, Ky.: University Press of Kentucky, 1996); Colin S. Gray, *Maintaining Effective Deterrence* (Carlisle, Pa.: Strategic Studies Institute, U.S. Army War College, August 2003).
14. Nevertheless, some continue to cling to the comforting and convenient Cold War belief that, as long as the United States makes severe threats, deterrence will function reliably and predictably. See, for example, Roger Speed and Michael May, "Dangerous Doctrine," *Bulletin of the Atomic Scientists* 61, no. 2 (March/April 2005): 43–45; "In Defense of Deterrence," *New York Times*, September 2002.
15. Donald Kagan, *On the Origins of War and the Preservation of Peace* (New York: Doubleday, 1995), p. 8.
16. Donald Kagan, "Honor, Interest, and the Nation-State," in *Honor Among Nations*, ed. Elliot Abrams (Washington, D.C.: Ethics and Public Policy Center, 1998), p. 1.
17. For a more detailed account of each of these cases, see Keith B. Payne, *The Fallacies of Cold War Deterrence and a New Direction* (Lexington, Ky.: University Press of Kentucky, 2001), pp. 40–57.
18. Crouch NPR briefing; Rumsfeld foreword, p. 3; Feith testimony, p. 3. See also National Security Presidential Directive 23, December 16, 2002, p. 2 (unclassified).
19. Feith testimony, p. 2.
20. "Adapting U.S. Strategic Forces," p. 4.
21. Stephen A. Cambone, statement before the Senate Armed Services Committee, April 7, 2004, p. 5.
22. "Adapting U.S. Strategic Forces," p. 2; Feith testimony, pp. 3, 5, 7; Crouch NPR briefing.
23. Rumsfeld foreword, p. 3.
24. Crouch NPR briefing; Admiral James O. Ellis, statement before the Senate Armed Services Committee on the Nuclear Posture Review, February 14, 2002, p. 7.
25. See, for example, Dianne Feinstein, "Policy May Lead to Danger, Not Safety," *Miami Herald*, January 15, 2004; "Parsing the Nuclear Posture Review," *Arms Control Today*, March 2002, pp. 15–21; Speed and May, "Dangerous Doctrine," pp. 39–49; Carl Levin and Jack Reed, "Toward a More Responsible Nuclear Nonproliferation Strategy," *Arms Control Today*, January/February 2004, pp. 9–14.
26. Gordon testimony, p. 5.



27. "Adapting U.S. Strategic Forces," p. 5.
28. See Julian Borger, "Bunker Bomb Will Bust Test Ban," *Guardian*, March 11, 2002 (comments by Rumsfeld); Linton F. Brooks, statement before the Senate Armed Services Subcommittee on Strategic Forces, April 4, 2005, pp. 2–3.
29. Tom Scheber, "The ABCs of the NPR" (unclassified briefing, 2003).
30. Gordon testimony, p. 5; Scheber, "The ABCs of the NPR."
31. Crouch NPR briefing; Keith B. Payne, "The Nuclear Posture Review: Key Organizing Principles" (unclassified Department of Defense briefing on the NPR, July 30, 2002), p. 9.
32. See Rumsfeld foreword, p. 1; Payne, "Nuclear Posture Review," p. 6.
33. Feith testimony, p. 5.
34. Ibid., p. 6.
35. Ibid., p. 7.
36. Sidney Drell et al., "A Strategic Choice: New Bunker Busters Versus Nonproliferation," *Arms Control Today*, March 2003, p. 9.
37. See the detailed account of this event in Payne, *Deterrence in the Second Nuclear Age*, pp. 81–87.
38. David L. Hobson, "Forward Thinking on Nuclear Policy," *Washington Times*, January 10, 2005, p. 14.
39. See Stephen Schwartz, "Don't Know Much About History," *Bulletin of the Atomic Scientists* 57, no. 4 (July/August 2001): 11; Walter Pincus, "The First Law of Nuclear Politics: Every Action Brings Reaction," *Washington Post*, November 28, 1999, p. B2.
40. See Keith B. Payne, "Action-Reaction Metaphysics and Negligence," *The Washington Quarterly* 24, no. 4 (Autumn 2001): 109–121.
41. Department of Defense, *Proliferation: Threat and Response* (Washington, D.C.: November 1997) (quotation from introductory "Message of the Secretary of Defense").
42. Quoted in Selig Harrison and Geoffrey Kemp, *India and America After the Cold War* (Washington, D.C.: Carnegie Endowment, 1993), p. 20.
43. "Japan Spells Out Nuclear Stance," *Los Angeles Times*, July 29, 1993, p. A18. See Martin Stieff, "Japan Mulls Atomic Weapons to Deter Nuclear Neighbors," *Washington Times*, November 10, 1993, p. A13; Patrick Garrity, "The Next Nuclear Questions," *Parameters* 25, no. 4 (Winter 1995-1996): 92–111.
44. Morton Halperin, "Parsing the Nuclear Posture Review," *Arms Control Today*, March 2002, p. 19–20; John Deutch, "A Nuclear Posture for Today," *Foreign Affairs* 84, no. 1 (January/February 2005): 49.
45. Feith testimony, p. 5; Rumsfeld foreword, p. 1.
46. Sokolski, p. 141; Halperin, pp. 19–20.
47. See Halperin, p. 20.
48. "Adapting U.S. Strategic Forces," pp. 5–6; Feith testimony, pp. 3, 5; Gordon testimony, pp. 7–8; Payne, "Nuclear Posture Review," p. 9.
49. Payne, "Nuclear Posture Review," p. 12.
50. Curt Weldon, "Congressional Delegation to North Korea Trip Report" (presentation, Strategic Nuclear Forum, February 22, 2005).

Senator BILL NELSON. Thank you, Dr. Payne.

Dr. Gallucci?

STATEMENT OF ROBERT L. GALLUCCI, DEAN, EDMUND A. WALSH SCHOOL OF FOREIGN SERVICE, GEORGETOWN UNIVERSITY

Dr. GALLUCCI. Thank you, Mr. Chairman, for the opportunity to join this discussion of the future of our strategic nuclear forces.

Mr. Chairman, let me start by providing what I think is my bottom line, and then work backwards to it. I think the bottom line for me is that the lower the level of our strategic forces, the better. The fewer, the better. If we can avoid qualitative augmentation of our forces, that would be better, too, for at least three reasons:

The lower the number of nuclear weapons and delivery systems we have, the cheaper; the easier it is to secure these forces, the less likely we'll have a case of unauthorized or accidental use. This is all assuming that the reductions are accomplished together with the Russians, as Dr. Drell said.

Second, if we can, in fact, lower force levels, we, and others who are nuclear weapons states, will more easily meet our obligations under the Nuclear NPT to engage in serious disarmament, and that is good for our efforts to discourage the spread of nuclear weapons.

Third, and most important, and it is a theme for me, if we can continue to lower, to the absolute lowest levels, our nuclear forces, and avoid qualitative augmentation, we send a signal of delegitimizing nuclear weapons as an element in our force structure. That, over the long-term, is, in fact, I think, the most important thing that we can do.

Let me go to the question of what we might use nuclear weapons for these days, because these days are different than past days. If I had two boxes, and in one box, I were going to put the threats that come from nuclear weapons, and then another box, threats that come from other sources that might require the use of our nuclear forces, let me say that, in the first box of nuclear threats, I can think of three, in descending order of importance, that you ought to consider. The first is the possibility that some terrorist group would acquire a nuclear weapon and use it against an American city. The second is that there might be an accidental or unauthorized launch of a nuclear weapon at the United States or an American ally. Third, that there might actually be the premedicated attack on the United States or an ally by a nuclear weapons state. Those are the three threats that I would propose to address.

The first, the most likely, is that a terrorist group, al Qaeda or an al Qaeda cousin, would acquire a nuclear weapon and introduce it into the United States. It seems to me that that is a threat against which we have neither a defense nor a deterrent. It is unlikely that we'll, either now or in the near future, develop much confidence in our ability to interdict the unconventional delivery of a nuclear weapon crossing our border—by a shipping container, a truck, or a boat—that we will have that kind of control over our borders seems implausible to me. So, interdiction is unlikely.

Deterrence, if your enemy values your death more than his life, is very difficult. So, neither defense nor deterrence seems like a way to deal with the most likely threat we confront over the next 10, 20, or more years. Therefore, we should be putting a lot of resources and energy into figuring out how to prevent these groups from getting either a manufactured nuclear weapon or the fissile material to produce one.

That seems to me to lead us in a direction not only of trying to secure fissile materials, but also trying to figure out what we might use our nuclear forces for in connection with this threat.

It seems to me that it is possible, if we are able to do two things—one is to attribute a nuclear weapon, either before it is detonated or after it is detonated, to its source—the weapon, or, more likely the fissile material—then we have the possibility of trying to persuade or convince any state that might consider providing that material not to do it, in order to avoid retaliation from the United States.

Now, there are two scenarios that immediately occur in this connection, and one is that the material was actually transferred by a country that decided to sell or transfer it. Candidates might be North Korea or, in the future, Iran. The other case, perhaps more likely, is where there's not actually an intentional transfer, where there is what you might call "leakage." Material comes out of Russia, or it comes out of Pakistan. These cases present different sorts of problems.

In the first case, I think a good old-fashioned classical deterrent threat is in order. That is to say that if we discover that a country has purposefully transferred fissile material or a nuclear weapon to a terrorist group, we ought to be telling them in advance that we will treat them as though they were the one who launched the attack, and they should expect devastating retaliation. In the other case, it's a bit more difficult, but I would suggest, as a matter of policy, that we say, if a country is found to have been the source of the material, even if it did not purposefully transfer it, but if it had, in a negligent way, failed to secure that material, that we will do the same thing; that is to say, to treat it as though it had launched the attack. The objective here is obviously to provide a little bit more incentive for that country to secure those materials.

In neither case would I suggest we be promising a nuclear retaliatory response, but that response ought to be available to the President of the United States, and it ought to be credible.

One more point on this most difficult case, and that is that it suggests the possibility that we might want to, at some point, consider a pre-emptive or preventive strike. Now, unlike retaliation, I don't believe—if we get into the world of needing to strike in a preemptive or preventive way—I don't believe that the use of a nuclear weapon would be appropriate. I think we ought to have a conventional force structure that permits us to launch such a strike in a conventional way. Even then, of course, it should be as truly a last resort. The first case.

The second case, which I regard as not very likely, but plausible, is an accidental launch or an unauthorized launch. All I would say about that is that we should work harder in order to increase the amount of time it takes to launch a strike, to, in other words, change the alert status of our deployed forces so that this unauthorized or accidental launch becomes even less likely.

The third case is the one that we typically use to size our forces and that is the need to have a deterrent to deal with the possibility of a premedicated strike on the United States or one of its allies. It is, to me, a very unlikely development, because I do believe deterrence has worked, and will work. All I will really say about this is that I would associate myself with Dr. Drell's comments. It seems to me hard to understand why we could not reduce our strategic nuclear forces to maybe half of what right now is the bottom number under the START arrangement with the Russians, which—I believe that number is 1,700—why some hundreds of nuclear weapons deployed aboard submarines, while maybe reducing the fractionation of the individual missiles to increase the survivability of the submarines even further, and continuing to maintain the ICBM force at lower levels, and continuing to maintain a bomber force, with both ALCMs and gravity bombs, and the Reserve Force comparably configured and sized, wouldn't be enough for this mission; and it would then go in the direction that I initially suggested would be good for lots of reasons, which is to say, to reduce substantially the amount of forces that we actually deploy.

If it's the other box, though—if those are the three nuclear threats, there are other threats which this administration has alluded to in various statements and publications, and they go to other threats that the United States may be subjected to, particularly with WMD, that are non-nuclear—in other words, the biological or chemical weapons threats—where the United States might wish to use nuclear weapons.

I am quite suspicious of this argument. I find all this suspect as an argument. Before one would use a nuclear weapon for these missions, one would have to have extraordinary confidence in our intelligence about these facilities and their status. After more than 20 years in government, focusing on just these problems, I rarely saw such a thing. I wonder whether we will, in fact, see such a thing.

Then there's the question of why we would want to have special-effects weapons beyond those low-yield weapons which we now have. Presumably, we would want to have them, because they would enhance the credibility of our use, because an enemy, if I understand this correctly, would, in a sense, be trying to figure out our tolerance for collateral damage. The less collateral damage we anticipated, the more likely they would conclude it would be that we would use these weapons; therefore, the more credible the threat, if I have all this right. This seems quite a reach, to me. It is a reach, in a number of ways, about whether we could, in fact, develop smaller-yield nuclear weapons that meet both tests—i.e., do better at the destruction of these sites than do our current small-yield weapons—and which still do not produce the collateral damage that we would find so politically and ethically unacceptable.

Now, on balance, when I look at the arguments, I am not persuaded that it is worth the cost to us, politically, in fielding new special-effects weapons. The costs in having us move away from the de-emphasis on nuclear weapons and move in a direction of trying to demonstrate to the world that they are, in fact, quite usable, if you're lucky enough to legitimately own them. That's not, in my view, a very good message to send.

Finally, with some reluctance, I do want to make a comment or two about the idea of developing a new RRW.

As I've understood this, this goes to the question of the durability of our confidence in the reliability of the current stockpile. It is, based upon my experience, passing strange that we would propose to improve this confidence by deploying a warhead, which we have not tested, to replace those warheads which we have tested. Now, if there are components that need to be replaced, and, therefore, the system, as Dr. Drell said, would not have been tested with the new component, I can understand that, to some degree. But I do ask the question of when, in fact, these components need to be replaced, and I do wonder what this program that we have spent so much money on, which I had understood was designed to put us in a position to have confidence in our stockpile in a no-test environment, actually accomplished.

If, ultimately, we deploy a weapon that we have not tested and would find necessary to test to have adequate reliability, then I do believe we would have the worst of all worlds, and we would have demonstrated that we wished to, again, put a special-effects weapon, in a sense, in our inventory, and we would have to consider the prospect of testing, which I think would be truly damaging to the message which is most important to convey. I say again, that message is that we wish to de-legitimize the use of nuclear weapons, the possession of nuclear weapons, and that message is something that we should seek to preserve.

Thank you, Chairman.

[The prepared statement of Dr. Gallucci follows:]

PREPARED STATEMENT BY ROBERT L. GALLUCCI

I want to thank the subcommittee for this opportunity to address some of the issues related to policy options for the future strategic nuclear force posture of the United States. I would like to begin by addressing three types of threats from nuclear weapons, in descending order of importance, that confront our country: first, the threat of a nuclear weapon delivered by a terrorist group and detonated in an American city; second, the threat of an accidental or unauthorized strike on the United States by a nuclear weapons state; and third, the threat posed by a premeditated attack on the United States or one of its allies by a nuclear weapons state.

The most likely threat comes from a terrorist group such as al Qaeda. If al Qaeda could acquire a nuclear weapon, few doubt that it would try to use it. Since it would deliver such a weapon by unconventional means—such as a boat, truck, or shipping container—we should not have much confidence in our ability to interdict this kind of a border crossing now or in the near future. Since al Qaeda members are known for valuing our death more than their life, neither should we expect to deter them. Lacking either defense or deterrence against this threat, we should put our energy and resources into preventing al Qaeda from acquiring either a manufactured nuclear weapon or the fissile material to make one. This means that we must persuade those countries with nuclear weapons or fissile material to secure them against unauthorized transfer—which we might call “leakage”—and deter them from any authorized sale or transfer.

For a variety of reasons, when it comes to leakage, we ought to be particularly concerned about Russia and Pakistan, and when it comes to intentional transfer, two different countries appear most worrisome, North Korea and, eventually, Iran. The question, then, is what policies should we adopt to persuade some countries to secure nuclear weapons and materials to our standard, and deter others form deciding to sell such weapons or materials. The first part of the answer is that we must develop the capability to identify the source of a nuclear weapon or the fissile material at its core, whether we should find it before detonation or have only the debris it produces to analyze after detonation. If we can accomplish this attribution with high confidence, through a combination of scientific forensic analysis and intelligence collection and analysis, and we can convince other countries that we can do this, then we can take the next step in persuasion and deterrence, that is, making a credible threat of retaliation. For those states that would intentionally transfer a nuclear weapon or fissile material, the deterrent threat is relatively straight forward, that is, to treat those countries as though they had launched the attack and to pose to them the prospect of devastating consequences, without excluding the use of nuclear weapons, if the United States or one of it allies should be the victim of a nuclear attack.

For those states that we are concerned might leak a nuclear weapon or fissile material to a terrorist group, and fail to take actions that we regard as reasonable and prudent to secure their weapons and material, we should warn them also that we will treat them as though they were negligent and thus as though they had launched the attack. The American public would demand no less. In neither the case of transfer nor leakage would our response necessarily involve nuclear retaliation, but in both cases the President should have the option of a precise nuclear response with as little collateral damage as possible. Obviously, if we are to gain the advantage of what may be called "expanded deterrence" to prevent leakage, countries such as Russia and Pakistan must be told that we have adopted this posture.

Beyond the missions of deterrence and expanded deterrence, we should also consider the force requirements of pre-emption and preventive war to deal with this threat. In contrast to a retaliatory strike, there is no reason to create the option to use a nuclear weapon to strike another country in order to prevent the transfer of fissile material or a nuclear weapon to a terrorist group, or to stop a country from even acquiring the capability to accumulate such weapons or material. But there is every reason to maintain the capability for pre-emptive or preventive strikes in our conventional force structure, even though we should see such options as a last resort.

This brings us to the second type of threat posed by nuclear weapons, that from the accidental or unauthorized launch of a nuclear weapon against the United States. Although this threat may arise from more countries in the future, for now it is almost exclusively one that is posed by Russian strategic nuclear systems. The best way for the United States to reduce the risk of such a launch would be to seek agreement with Moscow to measures that would, for both countries, reduce the alert status of our delivery systems, increasing the time required to launch strategic nuclear weapons.

The third type of threat, a pre-meditated nuclear attack on the United States or one of its allies by another nuclear weapons state, is the least likely event, but the one which guides our thinking in determining the basic size and character of our nuclear forces, just as it did decades ago when we confronted a hostile Soviet Union with tens of thousands of nuclear weapons. Today, and for the foreseeable future, the only country against which our deterrent could conceivably be tested is Russia, and neither that country's intentions nor capabilities would seem to require the number of warheads and delivery systems which we plan to deploy and hold in Reserve in the future in order to maintain a high level of confidence in our deterrent capability. It is hard to understand why it would not be enough to have some hundreds of warheads on deployed systems—Trident submarines, with a reduced number of warheads per missile in order to increase range and survivability, silo-based intercontinental ballistic missiles, and bomber aircraft with gravity bombs and air-launched cruise missiles—in addition to Reserve Forces of comparable size and composition. In short, this classic threat would arguably require less than half the 1,700 warheads permitted by the lower end of the range of deployed strategic nuclear warheads allowed under the Strategic Offensive Reduction Treaty. Those who argue that more is required of our strategic forces for this mission should be made to justify the assertion, without reference to any additional missions for our strategic nuclear forces.

None of the three nuclear threats just identified justify increases in our nuclear forces, and indeed I am suggesting that they may be accomplished at lower levels of forces. If we can substantially reduce force levels, there are real benefits to the national security to be realized, particularly if matched by Russia, and eventually by others. Let me identify three such benefits. First, the fewer the warheads and delivery systems that are deployed and maintained in Reserve, the easier it would be to secure them against theft and against accidental or unauthorized launch, and the less the need for fissile material to field them. Second, if nuclear forces can be reduced, it would help address the obligation of the United States and other nuclear weapons states party to the Nuclear Nonproliferation Treaty to engage in serious disarmament. Third, and most important, lowering the level of nuclear forces demonstrates a reduced dependence on nuclear weapons to achieve legitimate security objectives, which in turn contributes to a critical international norm of delegitimatizing the acquisition of nuclear weapons.

The other missions that have been identified for our nuclear forces are meant to improve our ability to deal with rogue states or terrorist groups and, particularly their intention or ability to attack the United States with chemical or biological weapons. The idea seems to be that we can better deter attacks on us by having new, smaller yield (and thus more credibly usable) nuclear weapons to use against these states or groups, and that we can better defend against attacks by having special effects nuclear weapons that are more capable of destroying an enemy's buried chemical or biological weapons facilities. Both these propositions are suspect. First, we already have small yield nuclear weapons in our inventory to impress rogues and terrorists, if indeed they care about what we may regard as acceptable collateral damage. Second, serious questions have been raised about our ability to produce a nuclear weapon whose ability to destroy underground weapons production or storage facilities significantly exceeds that which can be achieved with existing nuclear or conventional weapons—without producing politically and ethically unacceptable collateral damage. In short, given the incentives to avoid additions to our nuclear force, a convincing case for nuclear weapons designed to attack these targets has yet to be made.

If neither nuclear nor non-nuclear threats would require additions to our nuclear forces, and there are good reasons to try to reduce those forces, are there other reasons to consider augmenting our force posture? There are at least two more reasons that should be considered. One is a unique mission that is neither a case of classic deterrence nor defense; the other is the more general need to maintain confidence in the reliability of our nuclear forces without resorting to nuclear weapons testing.

We have until now considered nuclear and non-nuclear threats to the national security that might require nuclear weapons for deterrence or defense. There is, in addition, at least one scenario in which we might wish to threaten the first use of nuclear weapons, or actually launch a first strike, in order to forestall the use of conventional forces against U.S. interests: it is the Taiwan contingency. It is possible, at some future date, that China will seek to resolve the status of Taiwan by the use of force and the United States would then want to prevent this outcome without engaging in a massive conventional war so far from America's shores and so close to China's. In such a scenario, the threat to escalate to the strategic nuclear level by launching a disarming first strike against Chinese strategic nuclear forces might be an option the United States would want to preserve or create. Indeed, current Chinese plans for modernizing its strategic nuclear forces are at least in part aimed at increasing their survivability against just such a first strike, that is, at creating a deterrent. Our current plans to deploy even a thin defense against ballistic missiles aimed at the United States further complicate China's plans for such a deterrent.

The most prudent way to assess this scenario is in the larger strategic and political context. From such a perspective, it is profoundly in America's interest to maintain a nuclear force posture and a conventional force structure designed to meet our national security needs without ever resorting to the first use of nuclear weapons. While this proposition is relevant to some of the other missions envisioned for our forces mentioned earlier, it is most critical to addressing the China-Taiwan scenario because it bears directly on the motivation for Chinese calculations about their own strategic nuclear force requirements. In sum, our choice of policies for our strategic nuclear forces might some day be sensitive to Chinese strategic nuclear force deployments, but our legitimate defense and deterrent needs with respect to China can be met now and for the foreseeable future, at existing or substantially lower force levels.

Finally, there is the issue of whether or not it is necessary to develop and deploy a new nuclear warhead so that we will be able to maintain confidence in the reliability of our nuclear forces for a longer amount of time than we otherwise might. Now, if such a new nuclear warhead were to be introduced to replace our existing, nuclear warheads, without first testing it, a serious question arises about why we would think it more reliable than the well-tested warheads to be retired. On the other hand, if the replacement warhead would eventually require testing in order to sustain the confidence we have in the reliability of our stockpile, then we should consider the implications of resumed nuclear weapons testing for our national security. Suffice it to say, that while many continue to argue against the benefits of our future adherence to a treaty banning further nuclear weapons testing—arguments which I do not accept—the disadvantages of eventually resuming the testing of nuclear weapons are undeniable. If there is a theme that runs through this presentation, it is that our Nation's security is best served by taking steps that de-emphasize the relevance and utility of nuclear weapons. Nuclear weapons testing undermines that proposition.

Senator BILL NELSON. Thank you, to all three of you.

Now, what we want to do is just have a conversation here.

Senator Sessions?

Senator SESSIONS. Well, I think we have our other colleagues here, and I'll be here a while, and they might have other——

Senator BILL NELSON. Okay.

Senator SESSIONS.—things. So——

Senator BILL NELSON. Let's see, who came first?

Senator Ben Nelson?

Senator BEN NELSON. Yes, thank you, Mr. Chairman.

Senator BILL NELSON. The other part of the full Nelson. [Laughter.]

Senator BEN NELSON. Just down the hall from the other Nelson.

Thank you, gentlemen, for being here.

Dr. Drell, you commented in your written testimony, and you said it, as well, in your oral testimony, that over 40 countries are pursuing nuclear technology. Now, in many cases, we believe—believe, and I emphasize that—it's for civilian power. But we all understand that once uranium has been enriched for peaceful purposes, it can, and is probably being harnessed for other uses that don't correspond with our desire for security. You argue that the both the U.S. and the Russian Federation should reduce their stockpiles. Of course, I think many would say that, in a world with so many countries desiring to join what you call the nuclear club, we shouldn't be reducing our stockpiles. So, where we have some people saying, as you are, that perhaps mutually reducing stockpiles would be beneficial, and others are now saying that's not the case.

We know that we don't need a Cold War II, even though Cold War I is over, but how do you—what is the response that you really make to those who don't want us to reduce our stockpile because they believe we're really going to need this, with 40 countries developing and no real capability, short of perhaps some sort of a launch against their locations, that we really do need to have a strong and robust stockpile?

Dr. DRELL. Thank you. My first comment is that the urgent need we have, at the moment, is to develop a process for gaining control of the enrichment process. When I say 40 countries, I'm saying there are countries with nuclear reactors; they've bought them or they're using them. There are not 40 countries that can enrich uranium. So, the efforts which this administration has put forward, that President Putin has put forward, that the International Atomic Energy Agency, under Dr. ElBaradei has put forward, to gain control of the enrichment process, to try to guarantee a fuel for the reactors for peaceful research, but not have them develop indigenously the capacity to enrich uranium, so—in fact, the whole fuel cycle would be one that would be controlled. The mechanism has to be worked out politically, to what extent it's IAEA, to what extent it is nuclear nations. That is to be worked out. But the fact is—the key is to maintain control of the enrichment process, because without that, then, indeed, we are in great trouble. But——

Senator BEN NELSON. Well——

Dr. DRELL.—then, for instance, when it comes to turning back—again, the question is, when we start reducing numbers, you have to ask how many targets there are for you—

Senator BEN NELSON. Right.

Dr. DRELL.—because when you're talking about a country just beginning to develop an enrichment capacity or a few weapons, that doesn't present you with hundreds or thousands of targets. So, a careful balance of how many targets you have, and, therefore, how many warheads you would need. In our study that I mentioned, Dr. Goodby and I looked at the Russian problem; if they were to come down, and we looked at the targets of military control, political control, and of weapons that were mentioned in the NPR, we said, there, that there aren't more than a few hundred targets. That's how we came up with 500 deployed and 500 reserves. It's a quantitative question.

Senator BEN NELSON. Well, that certainly would apply to, perhaps, the current situation with respect to the former Soviet Union, and particularly Russia, but, with other countries having the capability of enriching in the future, what does that say? How could we—if we reduce the stockpile, under what terms do we find that we might need to increase it, if, in 10 years or 20 years, the rest of the world, these other countries, are now into enrichment? I agree, controlling enrichment is a good part of it, but enriched uranium can still be sold, purchased, and get into the wrong hands. How will we be sure that we have enough stockpiled?

Dr. DRELL. Dr. Payne said it very well, we need a better intelligence system on these things. The intelligence challenge now is greater than it was during the Cold War.

Senator BEN NELSON. Yes.

Dr. DRELL. So, the number—and one of the reasons I said we have to maintain an infrastructure—it's called Stockpile Infrastructure 2030 or something like that—is because we have to be able to respond, if the need arises, because the enrichment process gets out of control.

So, there are a number of things we have to do. Have good intelligence, have the political process, with the cooperation of all the Nations that have signed the NPT—that's all but four Nations in the world, after all—have them cooperate with us in this effort to prevent the spread of the material with the additional verification requirements that we are working on to bolster the NPT. We have to maintain the weapons for deterrence. If the danger grows, if our effort to constrain the spread of the nuclear weapons material and enrichment capacity fails, indeed, we're going to have a larger stockpile.

Senator BEN NELSON. Well, but won't we be violating agreements that we've entered into with others? Can we do that unilaterally?

Dr. DRELL. We hope to have agreements. At the moment, our agreements stand that by 2012 we will have between 1,700 and 2,200 deployed strategic forces, and there's still a large number in back. I used a number of about 5,000. There is no specified number, but that seems to be the kind of number that's talked about and that both Russia and the United States have in the stockpile. Five thousand is an awful large number, when you consider the number of targets.

Senator BEN NELSON. Okay. One further question, Mr. Chairman.

Dr. Payne, in your written testimony, you commented on deterrence, and especially your views on non-nuclear capabilities, like prompt global strike. I appreciate those comments very well. I also agree with General Cartwright, who is the Commander of a Combatant Command of Strategic Command and Space Command, that we need this capability of prompt global strike. Senator Sessions and I worked, last year, on converting the Trident submarine to having non-nuclear capabilities, recognizing that time to act is short, and access may be denied or difficult. So, we really do have to be in a situation that requires a quick strike on a mobile ballistic missile launcher, for a high-value target, or whatever the situation may be, We do need that. We were unable to get it accomplished last year. If we don't convert Trident missiles for a prompt global strike, how long are we away from a strategic non-nuclear response, without that?

Dr. PAYNE. General Cartwright has mentioned in testimony—and I'll just use the numbers that he's presented—that, under normal circumstances, we would be 2 to 3 days away from having a non-nuclear capability, under the current situation; if we were very fortunate and had forces generated and in the area, we might be as little as a day away. So, the distinction in the timelines is fairly important. If there is a fleeting target or a very urgent target that needs to be addressed in a timeframe shorter than 1 to 3 or 4 days, then this capability is essential.

Senator BEN NELSON. Thank you very much. I appreciate it. Thank you, Mr. Chairman.

Senator BILL NELSON. Senator Reed?

Senator REED. Thank you very much, Mr. Chairman.

Dean Gallucci, when you were discussing the hardest cases, some type of terrorist getting hold of material, what we have to do, and what would be helpful, is if we could identify the source of that material, which leads to this issue of the forensics of the nuclear material. Is it possible to catalog the source of nuclear material, from a technical sense, so that, at least conceptually, we could identify, and then, having identified, be able to attribute that to a nation-state or some entity that we could deter or at least retaliate? Is that possible?

Dr. GALLUCCI. Senator, what I think I know about this is that the answer is pretty clear, that we have some signatures we have collected over decades that would allow us, for example, in the first instance, if you don't have an unexploded weapon, but you're essentially in the business of analyzing debris, you could tell whether it was a plutonium core or whether it was a uranium core. If it was a uranium core, you might be able to quickly tell whether the uranium was enriched in a diffusion process or a centrifuge process. If it was plutonium, you might be able to, through an analysis of the ratios of the isotopes, figure out what kind of reactor, and maybe even which reactor, the plutonium was produced in. So, there are a lot of ifs here, but you might be able to get to the point of identifying the source of the material. It did not help that A.Q. Khan played Johnny Appleseed with a particular kind of centrifuge and spread it hither and yon so that you would get a similar kind of signature from that uranium. But the bottom line here is, our laboratories are working on this. They're prepared to do this, if necessary. We have some chance of this, and we have begun to talk about this, because, if we want to gain deterrence, the bad guys need to know that they might get caught.

Senator REED. So, I assume that your view would be this would be a very worthwhile effort to pursue internationally, to try to develop a regime in which the producers of nuclear material are, either by self- declaration or inspection, sort of, list the products on the label so that if something goes off, we know.

Dr. GALLUCCI. Yes. The idea of an inventory would, of course, have a lot of benefits to it. We'd have to worry about spoofing in the course of doing that. But, yes, I think everything we could do to be able to trace material back would be of benefit.

Senator REED. Is this bought—supported outside the United States? I mean, are there international agencies and other countries who say, "We understand this is important, let's do it"?

Dr. GALLUCCI. I'm sorry, Senator, I really don't know that. That probably is knowable, but I just don't know it.

Senator REED. Right, okay. Very good. I don't know if anyone else has a comment, but——

Let me turn to the Moscow Treaty, which is mentioned by Dr. Drell and others. It does call for a reduction by 2012, but the treaty is nonbinding, there's no duration, it's nonverifiable. Each side's free to determine when something's nonoperational, operational, and the question is, should the treaty be modified? Also, is it possible, within the scope of the treaty, to accelerate the reduction of the deployed nuclear weapons? I mean, this is one of those things that was announced with great fanfare a few years ago, and then suddenly it's ancient history. So, Dr. Drell, and then Dr. Payne, if you'd comment?

Dr. DRELL. It is an unusual feature of that treaty that it has no verification requirements written into it. On one hand, you can say that shows an evolution from a Cold War confrontation with an adversary to treating the Russians, now, more like England and France. You have to ask how far you want to go that way. I'm always comfortable when one has crisp, specific verification procedures, I have to say. How the evolution to a more cooperative relation should go politically—I'm a physicist, and I leave the strategic political judgment on how the governments are getting along to Washington. I have a little feeling that it's progress if we have a relation with Russia that does allow a certain element of trust. But, the bottom line, you have to verify.

We certainly could make more rapid the implementation of the Treaty of Moscow provisions. We could, for example, deactivate weapons that are being decreased out of the line. We could agree that, of the weapons that are in the 5,000, but not the deployed 1,700 to 2,200, we could agree that we don't need that many of them. We could look at the remaining battlefield weapons, the tactical weapons, forward deployed in Europe, and decide whether those couldn't go. That really is a basis—a matter of political judgment of how our strategic relations with the Russians are going. Are they working cooperatively as our partner, as they seem to be onboard in North Korea and now in the Iranian discussion, or are there problems? I'm not an expert there.

Senator REED. Dr. Payne?

Dr. PAYNE. Yes, sir. The treaty is binding between the two parties. It's not a nonbinding treaty. The requirement to reduce, by approximately two-thirds, the number of deployed nuclear forces is in the treaty, and will have to be abided by 2012.

The question about accelerating reductions, the answer is, yes, sir, reductions can be accelerated. In fact, that was mentioned specifically by the U.S. in 2002. Indeed, part of the presentation of the NPR showed periodic assessments of the situation, the geopolitical situation, so that if the geopolitical situation was such that those reductions could be accelerated, we could go ahead and pursue that.

Another question, another factor, as to whether those reductions could be accelerated was how well the United States was doing with regard to the development and deployment of advanced conventional forces and defensive capabilities. If we were progressing and maturing smartly towards advanced conventional and defensive capabilities, the thought was there may be enough mitigation of risks so that those reductions could be accelerated.

Another factor is the political condition. Looking out over 10 years, at that time, no one felt comfortable that their crystal ball was good enough to be able to predict what the geopolitical relationship would be like 10 years down the line. So, again, the idea was that we would have periodic assessments of the situation so that those reductions could be accelerated if the political conditions called for it.

The last point, I guess, of the question had to do with verification. Let me note, because it wasn't noted earlier, that the verification regime was to be derived from the existing START regime, with extensive verification provisions. That, then, really leads to the question that was brought up earlier this morning, and that is, what about START after 2009?—because the verification provisions for the Moscow Treaty are embedded in START. So, the real question isn't that there's no verification. There's considerable verification for the Moscow Treaty. The question is, what happens to START after 2009, and to those pertinent verification provisions?

Senator REED. That would suggest, when START expires, in 2009, we could think about modifying the existing treaty, the Moscow Treaty.

But one of the problems, I think, with the Moscow Treaty is that there's no timetable, there's no necessity to reduce any single weapon until, I presume, 2012, when the term of the treaty expires. So, literally we could be sitting, at 11:59 on the last day and, I guess, announce that we're reducing all our weapons, but then, the next day, the treaty's expired, and there's no legal binding requirement to make this reduction. In other words, it's a rather odd arms-control treaty. Also, my sense is that nothing is really taking place. I don't notice any action between the United States and Russia to begin serious discussions to—even a symbolic reduction of weapons. So, it is somewhat troubling.

Let me just go back to one question that was raised previously by Senator Nelson, and that is the discussion about taking conventional weapons and putting them on Trident submarines. Dean Gallucci, do you have a notion about that?

Dr. GALLUCCI. Senator, I think everybody knows that there are two contending values here. One is that I, like everybody else, would like to have the capability—be able to accomplish this mission of a prompt conventional strike against a fleeting, but important target. Then the other good is, of course, never to plan to do anything that—to accomplish that first mission—that might be misconstrued as the initial launch of a first strike from a strategic system. So, I come to this with enormous skepticism, and would want to be completely persuaded that in no such circumstance would we be attempting to do this and running any risk of being misunderstood. I think there are political disadvantages to it, too, but I am, if you can catch the tenor of my voice here, hesitant about this. I guess, at this moment, I would say I am still unconvinced, but that may be because of my own ignorance. I worry a great deal that we not get into a situation in which a submarine on station and from a particular box launches a strike which now the Russians, later the Chinese, view as a pre-emptive strike, depending, of course—this all depends upon what the context is—for example is it a crisis context, a context that goes beyond the target state to other states? It is just such an enormous concern that it has to be addressed. If it is absolutely put aside, and there is no downside, from that perspective, then, of course, as a mission, I would like us to have that capability.

Senator REED. Dr. Drell?

Dr. DRELL. May I make a short comment on that?

Clearly, there are some needs for prompt global strike in the world. I would make three technical comments.

The first one, and most important, is what Bob Gallucci just said, there must be no ambiguity that the system is non-nuclear. So, the idea of mixing the loadings of a Trident sub seems to me the worst possible danger. If you can do it clearly—this is a non-nuclear system—I think that's essential.

But there are two other technical points which I think need to be looked at. We're talking about something that's prompt. We're going to get it in less than a day. We're going to get it in an hour or so. That means we must be able to locate it, at all times if a mobile target, with precision, because a conventional warhead, a few hundred pounds of high explosive does not have a very large kill radius, and you're talking about sending something thousands of miles, and getting very precisely accurate. One has to be sure that the target position location can be, in realtime, established that way. I think one wants to, but that's not an easy order. That's not impossible. It's not an easy order. It's a technical demand that has to be addressed and understood before one thinks one has anything.

The other thing is, the United States is a global power with bases around the world, and there are other technologies, including drones and other systems, that are nearby. Again, one has to ask the alternative advantages and disadvantages.

So, I think these are legitimate questions. They're hard questions. But the lack of ambiguity in what we're doing, non-nuclear, is, to me, overwhelming.

Senator REED. Dr. Payne?

Dr. PAYNE. Yes, sir. Let me just comment briefly on the concern over the possible Russian response to an at-sea launch of the conventionally-armed Trident, because this question was thought through at great length, with, I think, reasonable provisions to mitigate the possibility of a Russian misinterpretation.

But with regard to that question, let me just mention that the United States has, according to all the unclassified sources, over 1,100 at-sea launches of submarine-launched ballistic missiles (SLBM) in the test program over the years. Through 1988, we had no notification provisions to the Soviet Union. After 1988, we had notification provisions established, and we carried through with those notifications to the Soviet Union that we would be launching a SLBM in the appropriate timeframe, in the appropriate direction. So, there's a long, long history of U.S./Soviet and now U.S./Russian relations with regard to notification for the safe launching of non-nuclear ballistic missiles, and there's been no problem, there's been no misinterpretation, there have been no problems such as folks have mentioned with regard to a possible Russian misinterpretation.

I wouldn't be as confident in this, other than I look back, with 1,100 launches, open-sea launches of SLBMs, and we have provisions, since 1988, of notifying the Russians—Soviets then, Russians now—in that regard, as do the British have provisions for notifying the Russians with regard to their at-sea launches. So, I understand the concern. I agree we need to absolutely minimize the concern of a Russian misinterpretation. I'm also confident that we've already gone a long way towards that over the last 40 years.

Senator REED. I thank you. Just a final comment. You've been most kind, Mr. Chairman. Given the emergency circumstances where a missile like this would be launched, and particularly not in a designated range where these other tests have taken place, it might be very difficult to notify even our senior command of this decision, let alone the Russians. It would be unusual, by definition, and I'm not as sanguine about the record of test launches and ranges. I went on a D–5 shoot off of Cape Canaveral, which the—you could tell—and it's boilerplate, and the Russians have seen it for years and years and years. This would be, I think, something much, much different, probably a surprise to many people in the Department of Defense, not only the Russians.

Mr. Chairman?

Senator BILL NELSON. Well, assuming that you could get over that threshold of it being understood that this was not a nuclear launch, the question left hanging is the question of, does it offer a deterrence to a state or a nonstate actor?

Dr. PAYNE. Yes, sir. I believe that a prompt global strike, the conventional Trident or an alternative, could provide enormous deterrent advantages, including for extended deterrence. Let me give you a couple of reasons why.

First, one of the factors that contributes to the assurance of our allies is the notion that the United States can be promptly involved if, in fact, they suffer from an attack. This capability would certainly signal very quickly, that the United States was involved in their security on their behalf, and the anticipation of that should have a deterring effect on opponents, foes of our friends and allies, who think that the United States might be able to either stay out entirely, might stay out entirely, or might be out long enough for them to create a fait accompli. So, I see this prompt global strike as being very helpful with regard to deterrence, particularly extended deterrence.

In addition, we know that, for example, the PRC sees conventional ballistic missiles as what they call their "pocket of excellence," an area they excel in. For the United States not to be involved in the capability that they put so much store on is, in a sense, an incentive to move forward in that direction for folks that we might prefer to move in other ways.

So, I see the prompt global strike being useful for deterrence, being useful for now what's called dissuasion, trying to suggest to folks that they not move in those directions, because it's not an open avenue for them to have a pocket of excellence.

Senator BILL NELSON. What do the other two of you think about that, the question of the deterrence?

Dr. GALLUCCI. I don't think, even if we were completely free of our concern about the ambiguity of a strategic nuclear strike by using a Trident submarine for the launch, that I would be doing this for deterrent reasons. I think that I'd be doing it for strike reasons. We might get some deterrence out of it; and the promptness is something that we would value. In certain circumstances, we might be able to do this with deployed forward forces, with cruise missiles. I think we shouldn't overstate how much we're going to get from this. I don't think countries that are thinking of developing secret nuclear facilities or moving something from here to there are going to decide not to do it because there's a submarine somewhere on the planet that might strike them. I just think we're asking a little too much of this to do that.

Dr. DRELL. I find it mainly a strike weapon, not a deterrent weapon. There are not many targets I can think of that are so important you have to get them within an hour, as opposed to a day. I think if we go—move to a world where we're all going to have 30-minute strike capabilities halfway around the world from each other, it's not really the world I'd like to see us trying to develop. I would rather see us realizing that there is certain—value in time to think things through. But——

Senator BILL NELSON. Senator Sessions?

Dr. DRELL.—I'm not enamored with this weapon.

Senator SESSIONS. I get worried about all these things. I'll tell you what troubles me. So, in the next 5 years, we're going to have reduced the size of our nuclear stockpile down to numbers we haven't seen in 50 years, at the beginning of the Cold War. But I—the critics say, "That's not enough, we ought to go down to 500, or maybe less." Strategic Command develops a proposed substitute, non-nuclear global strike capability to substitute for nuclear strike capability, with the conventional Trident modification. The critics say, "No, that's risky." The Nuclear Weapons Council approves continuing study of a replacement warhead that would be safer, more reliable, and more secure. We could replace aging warheads with the same capability, because they're more reliable, perhaps have fewer of them. But critics are saying, "Well, we should stay out of the business of manufacturing warheads." We observed China take out one of its own satellites. We worry about strategic vulnerability of our space assets. It would seem to make sense to study whether defensive capabilities could be deployed on satellites to protect them. The critics decide that defensive capabilities look too much like offensive capabilities, and so we shouldn't have weapons in space, and they oppose that. I would just say to our witnesses, we have a lot of challenges out there. The objective of reducing nuclear dangers has a—and the number of weapons, certainly has an appeal. We would like to do that. But, continuing forward, as the "Caucus of No" would say, does not, in my view, advance our national security.

I think I would just ask you, maybe, to comment on that, and to comment on whether or not the reduction of our own stockpile and our self-imposed restraints—that are very costly financially, too, on occasion—are actually causing other nations not to develop nuclear weapons, or to reduce their capability, or cause nations not to develop a nuclear capability at all. Is that helping in any way? My time is short, I've rambled on. But, I mean, that's the fundamental question, to me, as a person who feels a responsibility to defend this country. Where are we heading, Dr. Gallucci?

Dr. GALLUCCI. When you read that litany of charges, essentially, I want to immediately leap and say, "Please do not confuse me with an advocate of unilateral disarmament or a pacifist." I spent my career in government service, in political/military affairs of various kinds, and I'm——

Senator SESSIONS. I would just say that we voted down—Congress voted down the penetrator—actually, research on the penetrator, and they voted down the prompt global strike non-nuclear system last year. So, we're in a deal here.

Dr. GALLUCCI. But, having said what I said, I have argued here for the lowest appropriate levels of forces, which is to say half of the 1,700 might do, and Professor Drell was talking about 500 deployed, 500 reserved—that's still a lot of nuclear weapons, with a lot of capacity for destruction. It has been classic for the United States to be worried about how much is enough. So, I think we can all be in that game of trying to assess how much is enough—trying to puzzle out what's appropriate and look at what missions we want these weapons for. I think that's what we're doing here.

I think suspicion of a particular weapon innovation really has to do with the instinct, which I really want as my takeaway from today from me, and that is instinct that we do not wish to call attention, internationally, unnecessarily, to nuclear weapons as an essential portion of a legitimate national defense establishment. We need nuclear weapons now—first and foremost, as a deterrent, so that others do not use them. If you ask all three of us, "is it a terrific idea to absolutely promise we will never use nuclear weapons first?" I don't think any one of us want to say, "we'll promise that," but we want to get to the point where we're able to accomplish our missions through the use of conventional forces, and the nuclear weapon is for a deterrent, and it's for retaliation for the use of a nuclear weapon, and that's it.

So, I think in each or many of the points that are made in the statement you made, Senator, my reaction is that we ought to be looking very carefully at the RRW. A lot of this is quite technical, and questions of when, in fact, components of the existing nuclear weapons may deteriorate and reduce our confidence and reliability—how much time do we have? Is this weapon actually going to increase our confidence if it is for all time, an untested weapon? I have no way, independently, of assessing that, but I know that, in the end, I want us to get to a point where we do not need to test, that we're confident in the reliability of our systems without testing, so that we can comfortably adhere to the Comprehensive Test Ban Treaty because of what that would mean politically as, again, a signal that we wish to de-emphasize the use of nuclear weapons for purposes other than deterrence.

So, this all goes, I think, to one's body posture. If there is a critique of what the administration has been putting forward in its various initiatives, it is the embrace of nuclear weapons for new missions, when we are looking to move away from the use of nuclear weapons to accomplish those missions. I think——

Senator SESSIONS. Well——

Dr. GALLUCCI.—that's the rub.

Senator SESSIONS.—I think body posture is—may be a factor that we certainly ought not to lose sight of, but I believe these nations are deciding, for their reasons. Iran is deciding, not on our body posture, but on—they've been working for a long time to have a nuclear weapon. Iraq was, had they not been stopped during the first Gulf War. Saudi Arabia, what are they going to do if Iran gets weapons? What about Egypt? What about Turkey? What about other countries? So, I'm not sure all that's happening because of how we handle ourselves.

But, Dr. Drell and Dr. Payne, if you'd just briefly respond to that. I know my time is a bit short.

Dr. DRELL. Senator, I have devoted a lot of my life to concern about American security. I'm not a disarmer, I'm not a "no-first-use-er," but I want to say, as a technical person, we have to make the right choices. First we have to do what's practical, and, second, we have to see how what we do may be interpreted elsewhere.

When I looked at the earth-penetrator discussion, and I commented on it, to me the value of an earth penetrator was extremely limited militarily. If I want to get a deep underground target, I have to know where it is. Precision and accuracy of location and delivery means much more than just penetrating and then getting an order of magnitude more of the energy. We have big weapons that can get underground. We have a number of big weapons. We didn't need that weapon, and it wouldn't do us much good. It would, however, affect how our efforts at maintaining a nonproliferation regime are going to be seen, not by Iran or North Korea, but by the 185 nations who signed the NPT and have said, when they extended it into the indefinite future, "We have to, ourselves, accept some of the restraints. We have to work toward the comprehensive test ban. We have to work towards reduction," because that's embedded in the treaty we have to use for their cooperation in trying to prevent this spread.

When I talked about the RRW, I said, "We need an infrastructure to be able to respond and maintain nuclear weapons," but I said, "Don't go ahead and build an RRW, when you don't know"—and I don't believe any technical person can honestly say that we can make a safer, more reliable, more effective weapon without testing it. Until you know that you can do that, it's a waste of money and it's a politically provocative thing to do. I want to—and I recommend—let us get a serious consensus built among the weapons labs. There's a report coming out, headed by a former weapons-lab leader, Dr. Tarter, which has been discussed—it's not fully released—saying exactly what I said.

So, I am not a disarmer, but I believe we have to do sensible things. I think it's important that we look at what other countries do, because I think getting rid of nuclear weapons as part of our policy is important, and I haven't given up on that.

I remember President Eisenhower saying so movingly, "the United States is determined to help solve the fearful atomic dilemma, to devote its entire heart and mind to finding the way by which the miraculous inventiveness of man shall not be dedicated to his death, but consecrated to his life."

President Reagan, the most extreme nuclear abolitionist who was ever President of this country, said, before he was President, during his presidency, and after, he said—he called for the abolishment of all nuclear weapons, which he considered—I'm quoting him—"totally irrational, totally inhumane, good for nothing but killing, possibly destructive of life on Earth and civilization."

To my mind, we have to make the right technical decisions, and I support them, but we also have to be careful how the political effort that you gentleman make are going to be seen around the world, and help push forward a nonproliferation regime.

Senator SESSIONS. Dr. Payne?

Dr. PAYNE. Yes, sir. I agree with Dean Gallucci, that the lowest number of nuclear weapons compatible with security should be our goal. In fact, that's the goal——

Senator SESSIONS. I'm pretty frugal. I agree with that, too. I don't——[Laughter.]

Dr. PAYNE. In fact, that's the——

Senator SESSIONS. From a money point of view; I'm not sure it's going to affect the psyche of some other nation, but—

Dr. PAYNE. Yes, sir. That's, in fact, the same goal that the President gave to us, in the Department of Defense, as we were pursuing the NPR, the lowest number compatible with national security.

So, then the question becomes, What's that lowest number? Let me just make a couple remarks in that regard.

First, with regard to President Reagan's vision of denuclearization, let's not forget what the other half of his vision was. That is, the condition of excellent, outstanding defensive capabilities for the United States, its friends, and its allies. It wasn't nuclear—a nuclear-free world in the absence of those defenses; it was a potential for a nuclear-free world in the context of those defenses. So, as we think about these visions of moving forward, let's not get out of sync if we're going to use President Reagan as the model of how we want to talk about this.

Second point concerns the notion that the lower we go with regard to nuclear weapons, the more capable you are of de-legitimizing nuclear weapons for others; that's essentially the notion that we've talked about. Let me just note—and I tried to represent this in my prepared remarks—that if lowering numbers of nuclear weapons de-legitimizes our—the credibility of our extended deterrent, then that's going to promote proliferation. It's not going to prevent proliferation, it's going to promote proliferation, because our extended deterrent, as I mentioned earlier, is, I believe, the single most important nonproliferation tool in existence. To maintain the credibility of our extended nuclear deterrence is the single most important thing we can do to contribute to nonproliferation. The example that I used earlier is the concern that the Japanese now have over the threat that they face and the U.S. extended nuclear deterrent. Japanese representatives have now been explicit with regard to what that means for them and the possibility that they might be interested in a nuclear weapon. So, that connection between our extended nuclear deterrence and nonproliferation is profound, and its importance for our nonproliferation goal, I think, cannot be overstated.

Let me suggest the next point, and that is, I don't believe, for a moment, that lowering our levels of nuclear weapons is going to have a positive effect on so-called rogue states and their desire for nuclear weapons. Remember, when we think about trying to engage in nuclear nonproliferation, trying to get states that don't want to have nuclear weapons in the first place, or cannot have nuclear weapons isn't the hard problem; the hard problem is trying to move states who want nuclear weapons away from having them. Those, in the contemporary world, look like Iran and North Korea. Those are the states of concern. They don't want nuclear weapons because we have nuclear weapons. They don't mimic us, in that sense. They want nuclear weapons for lots of reasons of their own. Whether we have an arsenal that looks like 1,000 weapons or 4,000 weapons, I don't think is going to have a bit of an effect on the desire for—by either Iran or North Korea to have nuclear weapons.

Senator SESSIONS. If we had negotiations with North Korea, and we cut our numbers down to 500, and they had 300 or 250, wouldn't that change the tenor of those negotiations?

Dr. PAYNE. Sir, remember that the——

Senator SESSIONS. Then, if they got to 500, wouldn't that be somewhat different, also?

Dr. PAYNE. Yes, sir, it would. If you look at the reason why they want nuclear weapons, to the extent that they discuss it, it has much more to do with our conventional prowess, which is second to none in the world. They want nuclear weapons, in a sense, to be able to trump our conventional capability. It has nothing to do with the nature of our nuclear arsenal.

Then, lets just conclude—and I appreciate the time, sir—it is that we don't know the future. One of the reasons to be careful about nuclear reductions is because we don't know the future. If we give up force structure now, it's going to be extremely hard, and extremely expensive, to ever get that force structure back. If my crystal ball were good enough to say it's going to be a benign future, we know Russia's going to move in a good direction, we know China's going to move in a good direction, then we could commit to these kind of reductions that are being discussed. But no one's crystal ball's that good, and, in a sense, we need to retain the force structure now to be able to reconstitute if the future moves in a less benign direction, because if we give up that force structure now, as I said, it'll be very expensive and very hard to ever get it back.

Senator SESSIONS. I think those are good comments. I certainly would like to keep our numbers down. But I don't want a major misconception to occur in the world that somehow this country lacks the will to use the power we have to defend this Nation, and that anybody that steps over a certain line is subject, in itself, to assured destruction. I mean, I think that's just where we are. We need to have that. I worry a little bit that everything that's proposed in the strategic area is opposed, and we have a hard time passing it.

I would note that we really are reducing our weapons. You go out to the Pantex plant in Texas, and there are warehouses and warehouses and bins of dismantled and destroyed warheads. We're melting down those things. We really are making a historic move. I would note, for the record, that there's no special-effects nuclear-weapons proposals to develop that now. The robust nuclear earth penetrator was not funded. Congress did not accept that. The RRW conceptual design selected is very similar to the historical designs, and has a connection pedigree to hundreds of nuclear weapons tests conducted in the 1950s and 1960s. So, I think we probably could do that without testing.

But I would just say, Mr. Chairman, I think it's a healthy discussion. It is a healthy discussion. I would maybe ask, with a follow-up written question—my time is limited—but, what about the Triad? How much of that is still necessary today, the money that's spent there? Is there some better utilization of that for our national defense?

[The information referred to follows:]

I believe that the current Department of Defense (DOD) strategy for the nuclear triad makes sense. The DOD has reduced the size of each of the legs of the nuclear triad and is making the remaining force structure more flexible. For example, since the beginning of this administration, the DOD has reduced the number of deployable ballistic missile submarines from 18 to 12 (4 have been converted to cruise missile submarines, 2 will typically be in overhaul and unavailable for deployment). To add flexibility to the remaining ballistic missile submarine force, DOD has proposed developing and deploying precision conventional warheads on some Trident missiles on each of the deployed submarines. The size of the long-range bomber force has also been reduced. The size of the remaining bomber force is based on needs for conventional weapon roles in major combat contingencies. In addition, the ICBM force has been reduced in size; all Peacekeeper missiles have been retired. Only one type of ICBM—the Minuteman III—remains. A nuclear triad at much lower combined force levels than existed during the Cold War makes sense. But the many good reasons for maintaining a nuclear triad remain. For example, the existence of a triad helps to ensure that no existing or potential opponent can envisage a successful competition in nuclear arms or a practicable strategy of eliminating the U.S. deterrent via offensive operation. These are potentially critical contributions to U.S. and allied security. As I stated earlier, we must be careful as we consider further reductions in the triad force structure so that we don't cut the force too deeply and find ourselves in an unintended position of weakness that invites challenges and provocations.

Senator SESSIONS. I'd just ask one question for our experts, briefly, if you would. Can a nation today—let's say a closed, or even an open nation today—develop a nuclear weapon without us knowing it? I mean, how hard is it for a country to develop, secretly, a nuclear weapons program?

Dr. Gallucci?

Dr. GALLUCCI. I think the answer is certainly yes to that question, depending on the Nation. If the Nation already has fissile-material production facilities—in other words, it's separating plutonium, particularly if it's a certain kind of reactor that's producing the plutonium, if it has an enrichment facility, then the possibility of producing the weapon secretly is there. This could be an advanced country, or it could be a country that is not so advanced if it has those facilities.

While I have the floor, Senator, so that I don't have a really terrible afternoon, let me say that at no point did I wish to convey that our decisions, or your decisions, about what we do with our force posture are going to have a particularly important effect on decisions that are made in Pyongyang or Tehran or these hard cases. But this discussion today, this hearing, was really about our broad force posture, as I understood it, and, when we're thinking about something like that, we have to think that there are 9 nuclear-weapon states in the world, the 5 declared and the other 4, and there are not 90. But there are 189 countries out there, and we'd like to continue to have to worry about what North Korea and Iran are doing, and not 40 or 50 other countries. So, I think, while the body-posture issue—argument I was making is really, you're quite right, irrelevant to the few hard cases who are going to make these kinds of regional decisions of their own, there are a lot of other countries out there which have decided not to acquire nuclear weapons, that could acquire them. I associate myself with Dr. Payne's comment here, that our ability to extend deterrence is absolutely critical, and that has to be on the list of missions that our weapons need to be able to accomplish. So, I believe that's true. I don't believe we are particularly suspect with respect to extended deterrence, but I do believe that he is absolutely correct that that is something that we need to sustain.

Thank you.

Senator SESSIONS. Thank you.

Senator BILL NELSON. Is there unanimity in the panel on the proposition that less nations having nuclear weapons is a good thing? [Nodding of heads.]

Okay. Is there unanimity in the panel that less weapons possessed by the United States and Russia is a good thing?

Dr. DRELL. To a point.

Dr. GALLUCCI. To a point.

Senator BILL NELSON. To a point.

Dr. PAYNE. With conditions, yes.

Senator BILL NELSON. All right. For the record, state, Doctor, what does "to a point" mean? Dr. Payne, state what "with conditions" means.

Dr. DRELL. I said "to a point." If I don't know—it depends upon the—how big the band of uncertainty is about what other countries have. I want to have a deterrent. I want to have extended deterrence. I want to have deterrence. It depends upon, again, the uncertainties out there. I don't want to be the weak one.

Senator BILL NELSON. Dr. Payne?

Dr. PAYNE. I agree, we don't want to give up deterrence, we don't want to give up extended deterrence, we don't want to give up the assurance that the nuclear weapons provide, or the dissuasive effect that nuclear weapon provide. With regard to the conditions, I mentioned the—just briefly ago, that one of the conditions associated with moving down to variable levels of nuclear weapons should very effective defenses. Although the NPR called for the United States to move toward very effective defenses against—at least against limited threats, I should say we're not there yet.

Senator BILL NELSON. All right. Well, on the flip side of this, those other countries are asking the same thing. Do their nuclear weapons deter us? I would take it that certainly what we've seen in North Korea is that they think that they're going to get something from the fact that they have developed nuclear weapons. So, do their nuclear weapons deter the U.S.?

Dr. GALLUCCI. Senator, from what? The issue with deterrence is—one of the issues is what you are hoping to deter. I think we could be pretty confident, unless one drew the conclusion that there was clearly irrationality and insanity in the leadership, we could be pretty confident that we will not be attacked—the United States of America will not be attacked by North Korea. But there are so many other consequences of the North Korean nuclear weapons program which threaten our security, and that of our allies, that engaging in a negotiation to try to get rid of those weapons is very sensible. But the particular concern that they will mate these weapons with their extended-range ballistic missile and directly attack the United States of America isn't high on my list of things to worry about. There are many more things that come from this that I'm more concerned about.

Senator BILL NELSON. That's, of course, what most of us feel. I'm trying to look at it from the other side. The idea goes to the legitimization of nuclear weapons. When is the idea of a nuclear strike not feasible? Is deterring the United States a motivator on smaller nations, other than Russia and China?

Dr. PAYNE. Yes, sir, I believe it is. A motivator for them to want nuclear weapons? Is that the question?

Senator BILL NELSON. Yes.

Dr. PAYNE. Yes, sir. I believe that seeking a deterrent capability is a motivator for both Iran and North Korea, for example.

Senator BILL NELSON. Okay. Then, that being the case, what is the greatest incentive that we can give to them for not having nuclear weapons?

Dr. PAYNE. The greatest incentive that we could have, sir, would be to do away with our conventional forces that are the basis for their desire to have a nuclear capability to deter us. That would be the greatest thing we could do. I suspect that it would be a mistake to do that.

Dr. GALLUCCI. Wait. No, wait. But if we can——

Senator BILL NELSON. Dr. Gallucci?

Dr. GALLUCCI.—carry on this conversation. I believe that both the North Koreans and the Iranians are interested in having a nuclear capability, for a variety of reasons. One of the reasons is to be able to deter the United States from using its conventional forces, either in the region or directly against them. But that's not all. I would put forward the proposition that the Iranians are truly interested in a hegemonic political position in the Gulf, and the acquisition of nuclear weapons would help them achieve that political objective, so that they are not simply interested in deterring us. That's why I believe they are a harder negotiating target than is North Korea. I do believe that North Korea is principally interested in regime survival, and is looking to deal with us, as a possible advocate of regime change in North Korea, and a negotiation that persuaded them that their security needs could be met through a relationship with the United States might lead them to give up these weapons. Iran, I regard as having a slightly more challenging set of objectives.

Senator BILL NELSON. All right, let's talk about the RRW. If we agree that, generally, with the conditions that you've placed on it, that it is desirable for us to reduce the number of nuclear weapons that we have, along with Russia, since we have plenty to blow ourselves up with, is the RRW—number one, is it safer? Are its component parts safer, so that it lessens the possibility of an accident? Is its reliability sufficient so that all of these nuclear weapons that we have in reserve, because we're not sure of the reliability, since they're degrading over time, that we would be able to significantly reduce our arsenal with the new RRW? Let's discuss that.

Dr. DRELL. I believe that point has yet to be made. But let me say, my starting position is, our weapons are safe. In 1990, I led a study for the House Armed Services Committee, backed by the Senate Armed Services Committee, with Johnny Foster and Dr. Townes, the inventor of the laser—there was a three-man committee, and we came to the conclusion that the weapons to be in our enduring stockpile meet all the official safety criteria that are in our policy.

Senator BILL NELSON. All right. I think everybody feels that that's the case. Now, are they reliable?

Dr. DRELL. I'm coming. Since the moratorium on testing started, in 1992, first by President George H.W. Bush, and then continued by President Clinton, we have had a very extensive multifaceted stockpile stewardship program that has gone into understanding the scientific—underlying processes in our weapons. We didn't do that to the full extent during the buildup of the first 50 years, because we were always changing the weapons, improving them, until we got to a point where the weapons really were quite robust. We now understand those weapons better, we have done extensive surveillance, extensive forensics, pulling them apart year by year, and we have, in my mind, increased our confidence in the reliability of the stockpile, at least mine, as a scientist who's worked these issues, because we understand them better, we know what to look for, and we have, in my mind, better confidence that if something's going wrong, the bells will ring, and we'll hear them. There have been findings—there are always findings when you build a weapon, because there are mistakes made in the production, there are birth defects that we discover. We've found them. I believe it is a fair statement that there is no significant aging of the weapons that has been found. I believe the stockpile, currently, is safe and reliable, and is not aging.

Now, that doesn't mean one can be complacent. One would like to improve them. In particular, in the world of terrorism, where a bad guy may get his hands on one of these weapons, if I can do anything to give them better use control, meaning that a bad guy getting one of my weapons cannot use it against me, I want to do that. But I believe firmly, as I said in my testimony, and based upon not just opinions, but work, that the ability to improve any one of these three categories has to be rigorously understood. Can we do it and have greater confidence? We have a stockpile which is built on a thousand-plus tests. To think it's easy to have greater confidence when you make some changes in a system like this, without testing, that's quite a statement, and I think that has to be—that's the statement where I say: I don't know the answer to your question, but we'd better find out before we go down the road, because clearly if we go down that road and we're building new weapons, and we give the impression that it's important for us to continue to modernize and improve, that does not, in my mind, help our nonproliferation goals. I think they are important.

Senator BILL NELSON. Do either of you know the answer? Is a replacement warhead that isn't going to be tested—is that reliable? Do either of you have the answer to that?

Dr. GALLUCCI. No, Senator, I don't.

Dr. PAYNE. No.

Senator BILL NELSON. So, that's a question we have to answer.

Dr. DRELL. I think it has to be answered, and I think that's going to be a very important part of the debate here in Congress. First of all, it's a very important part of the weapons establishment and those of us involved in seeing that that question gets the highest attention and that we come back to Washington with an answer in which we are confident and has a consensus. Because I see no reason not to make the weapons safer, if I can with confidence, or more reliable, if I can with confidence, or with better use control. I don't see that's a vice.

Senator BILL NELSON. But if it were not reliable and had to be tested, the opinion would be you don't go to an RRW. Is that——

Dr. DRELL. Unless we found some deficiency from our surveillance and life extension program which demands a change. That's why I said, don't savage those programs in pushing the RRW. Maintain the high quality that they have had for the last decade.

Senator BILL NELSON. Well, until we know whether this whole thing is feasible, how much life extension should we go through?

Dr. DRELL. We have to—for the weapons that are in the stockpile, we have to keep our eyes on the ball ,and we have to say that the W–76, the W–88, the W–87, that these weapons, which are part of our deterrent, however much we want that deterrent to be, they are reliable, period. We don't give up on that, in my mind.

Senator BILL NELSON. In your opinion, if we determine that they are reliable with this life extension, then we can reduce the existing stockpile.

Dr. DRELL. Absolutely. Absolutely.

Senator BILL NELSON. Any different opinions there? [No response.]

Since you all are the experts, is there any kind of rush going on to complete this feasibility study on the RRW?

Dr. DRELL. I—well, I'll stop talking in a minute, but let me just say—I don't see the signal yet that appears that there's an aging signal that's of concern. In fact, it was widely reported that the weapons labs reassessed the lifetime of the plutonium pits, and the Jason Group did its own independent work, which I was involved with. We now know that that concern about plutonium aging, because of the radioactive environment and its impact on the pits, is not a problem that can't be handled. It's—the lifetime now is of the order of a century. It was thought to be less so, I don't see any aging problem, and we are doing—we are—we're doing things—have been, for 15 years, in making the weapons more robust as we've gone along.

Dr. PAYNE. I can mention, in that regard, Senator, that my understanding is that the last generation of designers and engineers with direct test experience will largely be retiring——

Dr. DRELL. Yes.

Dr. PAYNE. —within the next 5 years. So, I think there is a near-term opportunity, perhaps a fleeting opportunity, to transfer the knowledge from these experienced scientists with direct test knowledge and experience to the next generation of designers. I think that could be important.

Dr. DRELL. Let—if I may comment on that, because——

Senator BILL NELSON. Certainly.

Dr. DRELL.—I think it's very important that we maintain experts who know what they're doing in the labs. I think that if you look at the money that's been invested in the program over the last 15 years, with new instruments for much more detailed surveillance and analysis, simulations, the best computers, the possibility of doing underground subcritical tests in Nevada, where you don't generate a chain reaction, but in which you study the effects of explosives on plutonium prepared in different ways, these are all part of a very multifaceted program that is challenging to the scientists. There are—there is something visceral about saying, "I'm going to blow out the side of a mountain." We all know that. But I think, in terms of scientists learning the trade, the ability to do the detailed new codes, high-fidelity, three-dimensional explosion codes, with the world's best supercomputers, now having the National Ignition Facility—it's going to give us data, where these codes can be tested in areas they've never been tested before, much more like bomb material—there is a good program, and I think attention is being paid to get very good scientists, and mentor them. I don't think that is a detonation of a new bomb is necessary, but it is necessary to have the management of the labs pay good attention to the problem that Dr. Payne raises. It is a concern. I think it's being addressed properly.

Senator BILL NELSON. Let's talk about numbers of weapons. Should the numbers in the arsenal be determined by specific targets?

Dr. PAYNE. I don't believe so, sir. There was the Cold War approach to looking at the numbers required typically had to do with the number of targets in the Soviet Union. What that meant was that we defined "deterrence" in a numbers game. We also then defined our strategic requirements from that same numbers game. But, as I mentioned earlier, the relationship of numbers to deterrence, and deterrence effect, is something now that's very uncertain. The role of our strategic nuclear forces is well beyond deterrence. So, if we want to think about the numbers in general, if there's a—if there were a diagram to how we think about numbers, it wouldn't have so much to do with the number of targets, per se—that's, in a sense, the way we looked at it in the Cold War—but it would be the numbers that we think are important for dissuasion, for assurance, particularly extended nuclear deterrence, and the numbers that we think, then, are also associated with deterrence, as well as we can know them. So, it really isn't any longer just a numbers game. We treated it that way during the Cold War, and, fortunately, deterrence didn't fail. But we need to think about it much more broadly now.

Senator BILL NELSON. Go ahead, Dr. Gallucci.

Dr. GALLUCCI. I've never built a SIOP, so I don't have any hands-on experience in this. But I would be surprised if numbers were not still very important—first, for the mission which I think is the most critical, which is the deterrent mission. I'm really unclear and unsteady and concerned about Dr. Payne's reference to the "other missions." That's what I tried to address in my remarks earlier. I'm comfortable with an absolute insistence that whatever capability exists, independent of Russian intentions, but whatever capability exists in Russia by the usual standards, that we do the counting and we figure that we have a secure, survivable, second-strike deterrent. So, I'm still up for those numbers.

Additional missions for these nuclear weapons, I think my view is generally that they are the lesser and included cases—that we have small-yield weapons to accomplish some other missions, which I think are really, for me at least, very limited. I am not interested in using nuclear weapons in a first-strike mode to go after some hard targets. I do believe that the deterrent mission after an attack, even by a terrorist, where you wanted to gain the deterrent advantage against that country that might have transferred the material, is sort of a new mission. But my thinking still is that, fundamentally, we are looking at a secure deterrent, and one that is credible for the purpose of extended deterrence. I think I'm still there.

Dr. DRELL. Just very briefly, I think whatever deterrent value our weapons have against the terrorists, if they see us with 20 weapons, I don't know if they'll be deterred. But I don't think the difference between 20 and 500 matters that much to the terrorists. To other states who have—want to survive, I look at what 20 weapons would do to 20 cities in this country, and I feel very comfortable that if we had 500, we'd have one helluva deterrent. So, there is a point where numbers get important, but I don't think we're near that yet, the large——

Senator BILL NELSON. All right, you're saying 500 instead of 5,000.

Dr. DRELL. That's right.

Senator BILL NELSON. Right.

Dr. PAYNE. Sir, could I comment? Because I don't want to be misinterpreted here. First, I don't think that numbers are unimportant. I think the numbers can be important. The point I was trying to make is that they don't tell the whole story. The additional missions that I was referring to have nothing to do with the tactical, or otherwise, use of nuclear weapons, per se. What I was talking about are the broad defensive goals of dissuasion and assurance, assuring our allies that—of our commitment, so they aren't interested in pursuing nuclear weapons, themselves, for example. So, when you look at the type of methodology that we want to pursue when we're thinking about numbers, it shouldn't just be tied back to deterrence and specific target numbers. That's what I meant. It needs to be broadened out, looking at all of these functions that nuclear weapons can help provide—and, again, not for a moment talking about pre-emption or tactical use of nuclear weapons. That's not what I was referring to.

Senator BILL NELSON. What about the concept of the Triad, as we have used it—submarines, ICBMs and airplanes—as a deterrent; multiple means of delivering nuclear weapons?

Dr. DRELL. I believe in the value of diversity. Absolutely, I wouldn't give it up.

Dr. GALLUCCI. I agree.

Dr. PAYNE. Absolutely.

Senator BILL NELSON. Well, let's assume that we proceeded down this road that we were going to have a SLBM that would be non-nuclear. Should all of the submarine-launched ballistic missiles be non-nuclear?

Dr. GALLUCCI. Since my principal concern is of the ambiguity of a launch from a strategic platform, like a Trident, there are various things that we could do to try to reduce that concern, and I'd start by designating a particular submarine as conventional, and not mixing. I mean, that's where I'd start. I don't know that that would do the trick, but that's where I'd start.

Dr. DRELL. I have no higher confidence in any part of our defense than I do in the Navy's Trident program. That naval nuclear program has been the outstanding program through its history. But I feel a lot better with just no mix on the same boat, nevertheless.

Dr. PAYNE. Yes, I certainly wouldn't convert the entire SLBM force to conventional weapons.

Senator BILL NELSON. Thank you all very much. It's been an engaging discussion, and thank you for lending your expertise to us.

Again, Dr. Drell, thank you for coming all the way from California.

Dr. DRELL. Thank you for the opportunity, Senator.

Senator BILL NELSON. May I ask one further question? Would you all be willing to accept some additional questions that would be answered for the record?

Dr. PAYNE. Sure.

Dr. GALLUCCI. Yes, sir.

Dr. DRELL. Sure.

Senator BILL NELSON. Okay. Thank you very much. The hearing is adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR BILL NELSON

DETERRENCE

1. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, during the Cold War, both the United States and Soviet Union had nuclear arsenals that ranged in the tens of thousands of nuclear weapons. The large numbers were predicated on the mutual ability to ride out a massive attack and mount a massive attack or counter attacks. Multiple warheads were needed for each of the thousands of targets. Mutually assured destruction (MAD) kept the two of us from entering in a war with one another. Thankfully, MAD is gone but deterrence theory remains. Does the idea of deterrence still drive the U.S. requirement for nuclear weapons?

Dr. GALLUCCI. The principal requirement for U.S. nuclear weapons remains deterrence. Although the political context has changed over the last 20 years, particularly with respect to our assessment of the intentions of the leadership in Moscow and Beijing, we must be certain that we have the nuclear forces to deter a nuclear attack from Russia or China. If we can do that, all other plausible missions for our forces will fall into the category of "lesser included cases."

Dr. DRELL. The answer seems to be yes. The only rationale I know for our retaining between 1,700 and 2,200 deployed strategic forces, according to SORT, or the Treaty of Moscow negotiated in 2002, plus several thousand more in Reserve, is to deter an equal number still retained by Russia. They also may be viewed as a deterrent against the use of nuclear weapons by the other nuclear powers not closely allied to us, namely China and perhaps Pakistan and India; and soon, if not already, North Korea. In these cases the numbers could be an order of magnitude smaller, given their own limited forces.

Dr. PAYNE. The four defense goals that contribute to U.S. strategic force requirements are deterrence, assurance, dissuasion, and defeat.

2. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, whom are we deterring with nuclear weapons, countries or terrorists?

Dr. GALLUCCI. I do not see a way that we can directly deter terrorists from attacking the U.S. by threatening a nuclear strike. However, we may be able to deter a nation from transferring a nuclear weapon or fissile material to a terrorist group by threatening to treat that nation as the attacker if a terrorist uses a weapon or material from that nation in an attack on us.

Dr. DRELL. It is difficult to think that terrorists are deferrable by nuclear weapons. They operate with standards that differ from that of the civilized world in general, and are even suicidal in many actions. Also the number of targets they present is so small that anything beyond a force of only a few nuclear weapons is irrelevant. So I would suggest that it is nations, and in particular the ones mentioned in question 1, that one may think we are deterring.

Dr. PAYNE. We hope to deter the leaderships of hostile countries and terrorist organizations.

3. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, what states pose serious threats of a nuclear attack and can they be deterred?

Dr. GALLUCCI. I do not think any nation currently poses a serious threat of a nuclear attack on the United States. Both Russia and China have the capability, but neither has the intention. Intentions, though, can change more quickly than capabilities.

Dr. DRELL. They are Russia, and China which presently has only a handful or two of long range nuclear weapons that can reach U.S. territory, but is building more. I find it difficult to see a role for our nuclear forces in deterring India or Pakistan. One can argue that perhaps, if it were not for our nuclear forces, North Korea might view taking aggressive military actions without fear of nuclear reprisal, despite our overwhelming conventional strength. The same goes for Iran.

Dr. PAYNE. Countries with self-expressed hostility toward the United States, a plausible flashpoint, and nuclear capabilities include most prominently North Korea and China. The potential for an escalating crisis with North Korea or China appears now to be most plausible.

4. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, is the idea of deterring a specific state or entity valid or should we look at a nuclear capability to deter an unknown actor?

Dr. GALLUCCI. We should first be certain of our ability to deter Russia and China—specifically taking account of the size and character of their forces. If we can do that, we will be able to deter any conceivable rising power in the Middle East or Asia.

Dr. DRELL. I think the idea of deterring a nuclear power has merit still in today's world, but for an unknown actor I believe strong conventional forces are more relevant.

Dr. PAYNE. The goal of attempting to deter specific states or entities is valid and necessary. We also must recognize that international relations are highly dynamic and we may in the future need to deter opponents not currently identified as such.

5. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, nuclear deterrence must be part of a much larger package of conventional military capabilities, diplomatic initiatives, economic and trade relationships, and many other tools to ensure security. Is it possible to reduce the role of nuclear weapons in deterrence and security?

Dr. GALLUCCI. We have been reducing the role of nuclear weapons in security strategy by responding to the changing political context and reducing the size of nuclear forces. In theory, we could eliminate nuclear weapons, if others did likewise. In practice, we can and should continue to reduce the number of nuclear weapons we deploy as Russia does the same. The less we depend upon nuclear weapons to achieve our security objectives, the more credible and effective will be our efforts to limit the acquisition of nuclear weapons by others.

Dr. DRELL. I think it is in our interest to reduce the role of nuclear weapons in deterrence and security. Diplomatic incentives and our overwhelming conventional strength remain quite relevant, and our non-nuclear military forces should remain strong and capable of meeting our foreign policy and national security goals. Given the danger of the spread of nuclear weapons and the spread of technology making more countries capable of acquiring that knowledge and entering the nuclear club, we should be working on trying to escape the nuclear deterrence trap. A more constructive way to view the problem would be for the United States to work to rekindle the vision of the 1986 Reykjavik Summit, as expressed by President Ronald Reagan and General Secretary Mikhail Gorbachev, and take steps toward working to rid the world of nuclear weapons. These are outlined in my testimony.

Dr. PAYNE. The deterrence role for U.S. nuclear weapons is determined in large part by the context of a crisis, the character and goals of opponents, and U.S. deterrence goals. Each of these factors is likely to change depending on the context and opponent. Consequently, the value of nuclear weapons for deterrence is not static or entirely predictable. In some past cases, U.S. nuclear weapons were essential for deterrence, it would be optimistic to believe that they will not continue to be so in some future occasions.

CONVENTIONAL DETERRENCE

6. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, can the United States deter others with conventional weapons?

Dr. GALLUCCI. Deterrence means dissuading others from doing something they would otherwise do by threatening unacceptable consequences if they do it. We can never be sure when it works—only when it fails.

I think U.S. unconventional forces often deter adversaries from action. We have used our conventional forces many times in past decades, and have thus demonstrated our credibility to act when our interests are threatened.

Dr. DRELL. The answer I believe is yes, except perhaps for Russia and China in today's world.

Dr. PAYNE. In some plausible cases, non-nuclear deterrence threats are likely to be adequate and more credible than nuclear threats. In other plausible cases, U.S. nuclear capabilities are likely to he necessary for deterrence.

7. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, are countries deterred with conventional weapons?

Dr. GALLUCCI. Countries may be deterred by threat of a conventional strike, depending on the stakes and the credibility of the threat.

Dr. DRELL. Except for Russia and China the answer I believe is yes. I believe terrorists can be deterred with conventional weapons when they understand that the United States is willing to use such weapons to prevent them from carrying out terrorist or aggressive actions against our allies and our interests. They must know that the use of conventional force to protect our interests and our security is a policy we are committed to and will enforce. In contrast, for nuclear weapons the highest goal is to prevent their use.

Dr. PAYNE. See above.

8. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, are terrorists, even though viewed to be nondeterrable, ever deterred with conventional weapons?

Dr. GALLUCCI. It is not unreasonable to think that terrorists will limit their operations out of a concern that they might suffer an effective conventional counterstrike.

Dr. DRELL. Yes, if they know we will use them to prevent them from achieving their goals; and they fear our ability to destroy them if they try.

Dr. PAYNE. Over the past 200 years there have been numerous cases in which terrorists have been deterred with conventional weapons. In other eases, terrorists have not been directly deferrable, but they have been deterred indirectly via pressure on their sponsors. There is at least one reported case of this indirect deterrence of terrorists via nuclear threats.

CONVENTIONAL TRIDENT

9. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, the administration has proposed development of a conventional Trident missile to support a notion of prompt global strike—the ability to strike anywhere on the earth in less than 60 minutes. Assuming that the issues associated with nuclear ambiguity could be resolved, in other words not mistaking a conventional Trident for a nuclear Trident, does this type of capability deter a state or a non-state actor?

Dr. GALLUCCI. On the assumption of the elimination of nuclear ambiguity, this type of capability could deter a state or non-state actor from some activities.

Dr. DRELL. I believe prompt global strike has a potential role against a target that can be located very accurately within the small kill radius of a conventional explosion, even if it is mobile. That capability may prevent or deter a hostile act of great consequence. This is likely to be most effective against a terrorist within a state that does not have full control over its territory, but also against a rogue state willing to take aggressive actions against our interests and to suffer the consequences.

Dr. PAYNE. It is literally impossible for anyone to predict with precision what will or will not deter an unspecified opponent, in an unspecified context, over unspecified stakes. There certainly are plausible scenarios in which conventional Trident could contribute to deterrence.

10. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, would any Prompt Global Strike capability have any deterrent effect?

Dr. GALLUCCI. See response to question 9.

Dr. DRELL. It is not inconceivable that it would complicate a possible action if the perpetrator felt that self survival is not assured. To that extent it would have a deterrent effect, but I think the overall deterrent effect would not be very large.

Dr. PAYNE. Please see the response to question 9 above.

TAILORED DETERRENCE

11. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, a new concept to come out of the National Security Strategy and the 2001 Nuclear Posture Review is “tailored deterrence.” DOD joint operating concept documents define tailored deterrence as the development of strategies, plans, and operations that are tailored to the perception, values, and interests of specific adversaries. Do nuclear weapons play a role in tailored deterrence?

Dr. GALLUCCI. If the concept would require re-emphasizing nuclear weapons by producing special effects weapons, the benefit of being “tailored” would not outweigh the costs of asserting the utility of nuclear weapons for purposes other than deterrence.

Dr. DRELL. I believe deterrence must be restricted to preventing the use of nuclear weapons against us and our interests. The form of a threat that we want to deter cannot be accurately predicted, and therefore a certain degree of flexibility is needed. Among other things the deterrent must be capable of a wide range of strike intensities and locations. That is what “tailored deterrence” means to me.

Dr. PAYNE. Certainly. For opponents who are highly cost- and risk-tolerant, U.S. nuclear deterrence may be a necessary part of defining an approach to deterrence that has a reasonable chance of “working” as we would hope. This conclusion is not simply speculation; it is supported by historical evidence.

DISSUASION

12. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, the December 2001 Nuclear Posture talks about nuclear dissuasion—what is the difference between deterrence and dissuasion?

Dr. GALLUCCI. I have no idea.

Dr. DRELL. Dissuasion means to discourage planning for potential actions not in our interest, such as an opponent trying to build up military forces and strength equal to, or greater than, our own. This can be done diplomatically or by undertaking our own build-up to a point that it sets a level very difficult to match. Deterrence I view as preventing an attack, particularly by nuclear weapons if we are talking nuclear deterrence, by making clear that the attack cannot achieve its goal and that damage caused by our retaliation will make it not in the interest of the would-be attacker to proceed. As quoted in the Bush administration's National Security Strategy: "[o]ur forces will be strong enough to dissuade potential adversaries from pursuing a military build-up in hopes of surpassing, or equaling, the power of the United States."

Dr. PAYNE. The goal of dissuasion is different than deterrence. Dissuasion attempts to prevent crises and challenges before they emerge by discouraging opponents over the long-term from choosing broad courses of weapon acquisition and foreign policy that might put them in conflict with U.S. interests. Deterrence typically involves the prevention of more specific actions over a shorter timeline.

13. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, is dissuasion a valid theory?

Dr. GALLUCCI. See response to question 12.

Dr. DRELL. Dissuasion is a policy goal to be achieved through diplomacy, backed by strength. It may succeed or, oppositely, stimulate an arms race. I have not seen any convincing implementation of a policy of nuclear dissuasion that was achieved by a nuclear build-up.

Dr. PAYNE. Yes. in principle, it precedes the goal of deterrence on a timeline and. if successful, eases the challenges to deterrence.

OTHER COUNTRIES

14. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, what is the role of Russia in United States nuclear policy?

Dr. GALLUCCI. Russian nuclear forces should still be the basis for decisions about the size and character of our strategic nuclear forces.

Dr. DRELL. On December 13, 2001, President George W. Bush stated "the greatest threats to both our countries come not from each other, or from other big powers in the world, but from terrorists who strike without warning, or rogue states who seeks weapons of mass destruction." The joint statement of a new relationship between the United States and Russia signed by Presidents Bush and Putin on November 13, 2001 stated that 'The United States and Russia have overcome the legacy of the Cold War. Neither country regards the other as enemy or threat." He went on to call for "the creation of a new strategic framework to ensure the mutual security of the United States and Russia and the world community." In the note announcing U.S. withdrawal from the ABM Treaty on December 13, 2001, the President said "We have entered into a new strategic relation with Russia that is cooperative rather than adversarial." These are examples of a number of statements during 2001 and 2002 in which the United States and Russia marked the formal end of the era of mutual nuclear deterrence between the two countries. Clearly that has not yet been fully implemented as a policy.

Dr. PAYNE. The United States must be in a position to deter Russia if it chooses a future course of hostility and competition. Whether Russia will choose this course or a more cooperative, benign future is an open question. The United States must encourage the former and be prepared for the latter. Pan of that preparation is maintaining a flexible nuclear base that can adjust as necessary to meet future threat developments.

15. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, what is the role of China?

Dr. GALLUCCI. We should be certain that the nuclear forces needed to deter Russia will also deter China.

Dr. DRELL. It would appear that deterrence remains a basis of U.S./China policy although the disparity in numbers of their weapons is very large. It is generally viewed that our nuclear weapons are a deterrent against a Chinese invasion of Taiwan.

Dr. PAYNE. It is important that the United States be able to deter the expressed Chinese willingness to use force, e.g.. nuclear weapons in a crisis over Taiwan, to assure U.S. Asian allies who feel vulnerable to Chinese nuclear threats, including Japan, and to dissuade China from choosing the course of nuclear arms competition. U.S. nuclear capabilities and nuclear infrastructure may be critical to each of these deterrence and dissuasion goals.

16. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, what are the roles of France and Great Britain?

Dr. GALLUCCI. I do no think that French and British nuclear forces remain important to their defense, to ours or to the NATO Alliance.

Dr. DRELL. I believe the roles of France and Great Britain are to maintain a seat at the table of the nuclear powers with their nuclear forces, and to provide an independent NATO deterrent against invasion from the east.

Dr. PAYNE. The French and British independent nuclear deterrents arc in the process of being modernized and upgraded and may contribute to the U.S. goals of deterrence, assurance and dissuasion.

17. Senator BILL NELSON. Dr. Gallucci, Dr. Drell and Dr. Payne, what are the roles of India, Pakistan, and Israel as non-parties to the Nonproliferation Treaty (NPT) or any future states that might pull out of the NPT?

Dr. GALLUCCI. India, Pakistan, and Israel had been the only countries with nuclear weapons, apart form the original five countries recognized in the NPT. North Korea claims to have withdrawn from the Treaty, but plausibly will rejoin if the agreement of 13 February 2007 holds. India will receive special status and legitimatizing if the administration's proposed deal is accepted by New Delhi.

The India deal could turn out to be the biggest foreign policy mistake of the Bush administration. Intended to recognize India's strategic importance to the United States, the deal could end up legitimatizing nuclear weapon status for former NPT parties who are otherwise generally responsible countries. Candidates are: Japan, South Korea, Argentina, Brazil, and Saudi Arabia; others would follow.

Dr. DRELL. India, Pakistan, and Israel retain nuclear weapons because of regional instabilities which affect them directly. It is presumed they will stay that way so long as the mutual hostilities between India and Pakistan, and Israel and the Arab world, remain high on the security agenda of these countries.

Dr. PAYNE. These countries illustrate that the international nuclear nonproliferation regime cannot prevent the acquisition of nuclear weapons by leadership that believe their countries to be at risk, and who believe that nuclear weapons are necessary to address that risk and to realize their national aspirations.

18. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, what about India and Pakistan in their role as regional nuclear weapons states?

Dr. GALLUCCI. If a nuclear weapon is going to be used in a conflict between two states, it will be used by India and/or Pakistan. As they build their arsenals—now with an American blessing—they create the possibility of a truly horrendous catastrophe.

Dr. DRELL. See response to question 17.

Dr. PAYNE. See response to question 17.

19. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, what about North Korea, which might have a few weapons, 8–10 according to some estimates, but which may be on the brink of giving up its program?

Dr. GALLUCCI. North Korea's nuclear program if unchecked would provoke Japan and South Korea to nuclear weapons acquisition. Even more worrisome would be the sale of fissile material to a terrorist group by this resource starved country.

Dr. DRELL. It would seem to be North Korea's deterrent against perceived threats of U.S. aggressive action, including regime change; also a bargaining chip for economic aid and cooperation. The future of North Korea's program is critical because if North Korea is able to establish that it has a deliverable nuclear threat, which it has not yet done, it will have a serious implication for a broader proliferation of nuclear weapons in Northeast Asia. It would undoubtedly encourage Japan, South Korea, and perhaps even Taiwan to go nuclear. Such changes certainly would drive up the level of nuclear armaments in China by a big amount. The ongoing 6 power negotiations arc of utmost importance in an effort to prevent that from happening and to protect the nonproliferation regime in that part of the world.

Dr. PAYNE. In light of North Korean nuclear capabilities, it is critical that the United States possess sufficient nuclear forces to extend nuclear deterrence coverage, i.e., the "nuclear umbrella" to allies in the region, e.g., South Korea and Japan. In the absence of credible U.S. nuclear assurance for Japan, there will be mounting pressure on Tokyo to consider becoming a nuclear state itself.

20. Senator BILL NELSON. Dr. Gallucci, Dr. Drell and Dr. Payne, what about Iran, which is enriching uranium at laboratory scale currently, claims to want nuclear technology for civilian purposes only, but continues to defy the International Atomic Energy Agency?

Dr. GALLUCCI. A full court diplomatic press, emphasizing carrots, should be made to persuade Iran to suspend construction of its enrichment facility. Sticks, in the form of sanctions, will have to be developed with Russia aboard if they are to have any hope of working. Ultimately, if Iran is found to be moving to enrich uranium to high levels, and if the character of the regime has not changed, the use of military force in the form of air strikes will have to be considered.

Dr. DRELL. Iran poses a very serious threat. Its program for enriching uranium in order to fuel reactors for civilian power, which is its stated goal, will make it into a latent nuclear weapons country. The technology for the one puts a nation well on the road to accomplishing the second of those two goals. A nuclear Iran would create even graver instabilities, not only vis-a-vis Israel, but with the rest of the Arab world, and would most likely stimulate proliferation among many nations in the Mideast. It is the gravest threat that I know at the moment to the Nonproliferation Treaty and the nonproliferation regime.

Dr. PAYNE. At this point, Iran appears determined to complete its longstanding efforts to develop nuclear weapons. This will increase the pressure for broadened extended U.S. nuclear deterrence to friends and allies in the region who may otherwise seek their own nuclear deterrent.

21. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, what about allies who don't have nuclear weapons, such as Japan, and who have not developed nuclear weapons, because the U.S. deterrence umbrella covered them?

Dr. GALLUCCI. I do not think the credibility of our nuclear umbrella, the extended deterrent threat, is serious questioned.

Dr. DRELL.. My main concern was expressed in the answer to question 19. Japan is a latent nuclear power that could become an explicit one in a very short order if they doubted the U.S. deterrence umbrella or if North Korea displayed an effective nuclear capability. This is an example of the kind of concern that motivates the thinking expressed in my testimony calling on the United States to try to rekindle a vision of a nuclear free world, and to implement the set of steps spelled out in my testimony toward achieving the conditions to make that possible. That will be the only long-term resolution to this dilemma.

Dr. PAYNE. It is critical that key allies such as Japan continue to have confidence in the U.S. extended nuclear deterrent. If they loose that confidence, according to their own statements they may feel compelled to seek their own nuclear capabilities. This could set off a "cascade effect" of nuclear proliferation globally, The U.S. extended nuclear deterrent is our single most important nonproliferation tool.

22. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, what about countries who might desire nuclear weapons but don't have a nuclear weapons program?

Dr. GALLUCCI. There remains great virtue in limiting the availability of facilities that produce fissile material, reprocessing plants and enrichment facilities.

Dr. DRELL. There are some 40 nuclear capable countries, that is countries with reactors for civilian purposes. With the spread of technology and the growing reluctance to accept a two-tiered world in which there are discriminatory differences between nuclear and nonnuclear states, I fear many of these countries will seek to develop indigenous nuclear programs unless we and other nuclear powers demonstrate our commitment to the goals stated in the Nonproliferation Treaty. This calls for reducing reliance on nuclear weapons, working toward ratifying a Comprehensive Test Ban Treaty, and eventually toward elimination of the weapons. I think that now becomes an urgent and serious goal for U.S. foreign policy and diplomacy.

Dr. PAYNE. One of our goals is to assure those non-nuclear allies and friends oft he U.S. commitment to their security, and thereby to contribute to their continuing choice to remain non-nuclear. Another goal is to dissuade those who are hostile from choosing to develop or acquire nuclear weapons. We know that credible U.S. strategic nuclear capabilities contribute to the assurance goal: they probably also contribute to dissuasion as well.

TERRORISTS

23. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, conventional wisdom is that nuclear weapons don't deter terrorists. Do you agree?

Dr. GALLUCCI. See response to question 2.

Dr. DRELL. I believe that nuclear weapons in large numbers have nothing to do with deterring terrorists. The existence of a small number may make them think harder about taking aggressive hostile actions, but their behavior so far pretty much indicates to me that terrorists are not deterred by nuclear weapons. They are bent on suicidal actions and willing to take actions that defy the norms of civilized behavior as we know them.

Dr. PAYNE. No. Nuclear weapons may contribute to the deterrence of terrorist organizations indirectly through their state sponsors. There is some pertinent historical evidence demonstrating precisely this form of indirect deterrence.

24. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, are countries who might either supply a terrorist with nuclear materials deterred from providing such materials by U.S. nuclear weapons?

Dr. GALLUCCI. See response to question 2.

Dr. DRELL. I see no clear evidence of this. However diplomacy can be valuable in providing incentives for restraints against such actions. I think the seriousness of our diplomatic efforts to address terrorism and at the same time reduce our reliance on nuclear weapons will be an effective approach.

Dr. PAYNE. I believe U.S. nuclear capabilities are critical to the deterrence of North Korea, which may be such a state.

A DETERRED UNITED STATES

25. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, do nuclear weapons deter the United States? If so, under what circumstances?

Dr. GALLUCCI. One could imagine the United States deciding against the invasion of a country possessing nuclear weapons.

Dr. DRELL. I recognize that nuclear weapons played a big role in deterring potential U.S. actions during the Cold War. At present I can speculate that measures the U.S. might initiate against countries, such as regime change or use of preventive offensive military force, might not be considered against countries who have nuclear weapons, even in small numbers, that could cause harm to us. This is what makes it urgent for the United States to make clear that our policy and potential uses of force are such as not to give them cause to feel the need to deter us by getting nuclear weapons.

Dr. PAYNE. The United Stales is susceptible to both nuclear and non-nuclear deterrence threats. The complete vulnerability of the U.S. civilian population to attack contributes to this susceptibility.

26. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, do United States nuclear weapons or policy drive others to attain nuclear weapons or impact decisions about the number of nuclear weapons they have? If yes, what impact does or should this phenomenon have on U.S. nuclear policy?

Dr. GALLUCCI. Clearly the Russians are sensitive to U.S. nuclear weapons decisions, and we ought to take account of their possible responses when we make such decisions. Over the long-term, if we emphasize the utility of nuclear weapons for our security, other states are more likely to consider such weapons for their security. That is one reason why we should try, with the Russians, to reduce the size of nuclear forces and avoid deploying new nuclear systems.

Dr. DRELL. I think a U.S. commitment to honor the provisions of the Nonproliferation Treaty as mentioned earlier and to reduce its discriminatory features by reducing our nuclear arsenal, and its relevance in our policies, will contribute to reducing interests in other countries becoming nuclear. It is difficult to preach the virtues of a nonproliferation regime and of staying nonnuclear if we ourselves continue improving our nuclear arsenal and retaining large numbers. That is why, how we limit and justify our Reliable Replacement Warhead (RRW) program is so important, as I have testified.

Dr. PAYNE. In many cases, the number and type of U.S. nuclear weapons and U.S. nuclear force policy will have no impact on decisions to acquire nuclear weapons. The exceptions to this rule of thumb are those countries that have been under the U.S. "nuclear umbrella." If that umbrella becomes incredible, they will feel increasing pressure to acquire their own nuclear capabilities.

HOW MANY NUCLEAR WARHEADS

27. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, we have talked about deterrence and that nuclear weapons play a role in deterrence, how effective a deterrent against what types of actors will continue to be a point of debate, but now let's talk about how many we need. How many total weapons do we need, how many deployed, by when and for how long?

Dr. GALLUCCI. I addressed numbers in my prepared statement, but I am generally attracted to Dr. Drell's assessment.

Dr. DRELL. Responses to these two questions are contained in my study with former Ambassador James Goodby entitled "What Are Nuclear Weapons For?—Recommendations for Restructuring U.S. Strategic Nuclear Forces," published in April 2005 by the Arms Control Association. This report has been submitted for inclusion in the record of these hearings. I quote several relevant paragraphs from it: "First, as to the number of potential targets, we assume that Russian nuclear forces will decrease in numbers comparable to what we are proposing for the U.S. force. For reasons having as much to do with historical and political baggage as with military requirements, this assumption will be a major determinant of the size of the U.S. operationally-deployed force, as it appears to be today. . . ."

"We estimate that a U.S. strategic force of some 500 operationally-deployed warheads would be more than adequate for deterrence. Borrowing the notion of the Nuclear Posture Review, this force level would be enough to provide a degree of flexibility in a fluid security environment. This number is large enough to deal with the targets described generically in the Nuclear Posture Review as instruments of political control and military power . . . leadership and military capabilities, particularly weapons of mass destruction, military command facilities and other centers of control and infrastructure that support military forces.' We estimate these military targets, under the conditions we postulate, to number between 200 and 300, and we have sized the operationally-deployed force of strategic warheads at a larger number of 500 for reasons of operational conservatism. The excess allows for force readiness concerns, multiple targeting where needed, and the possibility of very sudden and unexpected surprises from Russia, for example, a breakdown in its military command and control caused by technical failures or a takeover by renegades. As Russia and the United States move farther away from the nuclear deterrent trap in which they are still ensnared, the sizing of their stockpiles would depend on other concerns and could be further reduced. The 500 operationally-deployed warheads would be augmented by those from the Responsive Force, which would be configured in two parts, the first able to respond to a rapidly building crisis—a Ready Responsive Force—and a second able to respond to strategic warning signals on a timescale of a year or more—a Strategic Responsive Force. This use of the Responsive Force underscores the need for sustaining an infrastructure for supporting it as well as the need to provide this force with appropriate hardening and concealment. As we look ahead a few years into the future, the total Responsive Force should have 400–500 warheads, a number comparable to the operationally-deployed one. This number would be adequate to target roughly 200 additional Russian sites, for example, those affecting industrial recovery—the major nodes in the electric power grid and air, ground, and rail transportation systems, as well as major industrial sites. These targets and the forces to attack them may be viewed, we hope, as only temporary remnants of the Cold War policy of assured destruction that may be discarded before long in the dustbin of history. In time, nuclear deterrence might be maintained entirely with a Responsive Force without an operationally-deployed force.". . .

"Potential Chinese targets are likely to cover the same generic list as for Russia, cited above, including their strategic strike forces, command and control centers, major military bases, and ports in the vicinity of Taiwan. With China's long-range nuclear forces remaining at anything like their present levels, the target list would be considerably smaller than the 200–300 estimated for Russia. This list would not generate U.S. force requirements in addition to the numbers we have proposed for hypothetical emergencies involving Russia. The same warhead can be targeted against multiple designated ground zeros. Yet, if there were drastic changes in the worldwide strategic picture that led the United States to simultaneous major nuclear confrontations against Russia and China, the United States would evidently begin a major buildup of its own. This would take time, but so would a major Chinese buildup. The force configuration of "500+500" that we propose provides a ready basis for such U.S. action.". . . .

"Regarding potential targets in North Korea or Iran, the list presumably would be much shorter because the territories are smaller, and the numbers of defense-related installations are much fewer than in Russia and China. That list would very likely be limited to single digits in each country."

Dr. PAYNE. There is no set specific number of deployed nuclear weapons that can be identified as being required for deterrence for a set point-in-time or length of time because deterrence requirements are dynamic, and because U.S. force requirements are also affected by assurance and dissuasion goals. That is why the 2001 NPR recommended flexibility and the range of 1,700–2,200 operationally-deployed nuclear weapons.

28. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, are the numbers driven by specific targets, and countries, or by capabilities?

Dr. GALLUCCI. Our numbers should be sensitive to the targets of the various kinds we identify to create the most credible deterrent threat.

Dr. DRELL. See response to question 27.

Dr. PAYNE. The appropriate range of numbers and the need for flexibility can be affected by each of these variables, which are not mutually exclusive, and also by the requirements for assurance and dissuasion.

29. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, what understanding should guide the decision to study the RRW and how do the numbers influence the nuclear weapons complex of the future?

Dr. GALLUCCI. Please see my prepared statement.

Dr. DRELL. The RRW program has two parts. The first is to transform the nuclear complex, and the second, to change the designs of the nuclear weapons in the arsenal. Concerning the first part, the nuclear complex needs serious attention as I testified. Parts of it date back to WWII and need to be updated in order for us to maintain the safety and reliability of the warheads in the stockpile as their numbers decrease. However the U.S. needs a clear statement of its long-term nuclear weapons policy goals which will determine the roles and missions of our nuclear forces, and their overall numbers, before we can determine the appropriate size and scope of the modernized infrastructure. It might be anywhere from 500 warheads to the present total of roughly 5,000, with between 1,700 and 2,200 actively deployed, as negotiated in the Treaty of Moscow. The second part of the program, to design new warheads, depends upon the answer to the key question of whether the goals of the RRW program for enhanced long-term confidence, safety, and use control can be achieved without underground explosive testing, a restriction that is in the legislation creating RRW. This question is worthy of study but has yet to be answered

Dr. PAYNE. We should proceed with the RRW knowing that any contemporary estimate of the nuclear force characteristics and size needed for the decades ahead is likely to require adjustment as the future unfolds. It is likely that we will be surprised by events that transpire over time. We should avoid actions that would significantly constrain the ability of the U.S. to adjust our forces lo changing national security needs. Instead we should anticipate surprise and focus on how best to protect a range of options for the future in an affordable, prudent manner.

30. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, is there a rush to complete the feasibility study of the first RRW design?

Dr. GALLUCCI. I cannot comment.

Dr. DRELL. I believe not. The current stockpile is strong and stable. Its safety and reliability have been confirmed by the ongoing vigorous and successful stockpile stewardship and life extension program which has revealed no significant evidence of aging problems.

Dr. PAYNE. Two areas of concern seem to warrant proceeding without delay on the RRW. The first concern is the vulnerability of the planned stockpile and deployed force to a systemic failure of the W76 warhead—the most numerous of the warhead types in the stockpile. The RRW program will initially provide replacement warheads for the W76 and reduce the high degree of reliance on the W76 warhead. The second area of concern is that of the workforce on which the nation will depend for decades to come to make decisions on how best to sustain a safe, reliable nuclear stockpile. Proceeding without delay on the RRW will allow remaining experienced designers and engineers to work closely with those that will shortly take their places as the senior managers at nuclear weapon laboratories and plants.

31. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, the U.S. will continue the life extension program for some time, in order to ensure the safety, security, and reliability of the current stockpile. Before we know if the RRW is feasible, how many warheads of any specific type should go through life extension?

Dr. GALLUCCI. I cannot comment.

Dr. DRELL. I think the first order of business is to establish a scientific and technical consensus as to whether the LLNL led effort to design the first RRW can achieve its goal of enhanced long-term confidence, safety, and use control relative to our current stockpile weapons, without underground explosive testing, before moving on to additional designs. The first design was chosen, as announced by NNSA, as a relatively conservative design and therefore should be in the strongest position to face up to the challenge of satisfying those criteria but this has yet to be established, and doing so will take time.

Dr. PAYNE. The RRW concept has not yet begun engineering development, and the RRW concept, while promising, is still unproven. 1 recommend against significant cut backs an planned warhead lift extension programs at this time. Significant reductions in life extension programs would be warranted after laboratory officials conclude that the RRW can be developed and certified without nuclear testing and have demonstrated that the country can produce replacement quantities of the RRW.

32. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, will the stockpile size vary if the RRW design is feasible?

Dr. GALLUCCI. I cannot comment.

Dr. DRELL. A nuclear policy decision clarifying what are the missions and targets for our nuclear weapons will have a major impact on the size of the stockpile. This could cause a swing of an order of magnitude in their numbers, as discussed in the report that I mentioned earlier and submitted for the record (Drell and Goodby "What Are Nuclear Weapons For?," ACA report, April 2005).

Dr. PAYNE. I anticipate that, for a specific force structure and operationally-deployed nuclear force, the total size of the nuclear warhead stockpile needed will differ significantly depending on whether or not RRW is feasible, and developed and deployed. The stockpile with RRW warheads should be significantly smaller in number and with fewer warhead types.

33. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, do you think that the RRW alone will allow substantial reductions in the total size of the stockpile, not just the number of warheads deployed?

Dr. GALLUCCI. I cannot comment.

Dr. DRELL. It is hard to predict whether the RRW alone would allow substantial reductions in the total size or cost to the stockpile since the current, so-called legacy, stockpile meets current high standards of safety and lifetime stability. However the infrastructure, when modernized, may have a significant effect by achieving improved efficiency with consolidation of many sites and modem technology. I think a more important factor in this case will be the modernized infrastructure.

Dr. PAYNE. I expect that development and production of RRW warheads will result in a substantial reduction in die total size of the stockpile of nuclear warheads. Risk of reliability failures in the operationally-deployed force is currently managed by retaining an inventory of backup warheads in storage. With an operating nuclear warhead infrastructure that is responsive to unanticipated warhead problems, the need for a large inventory of back up warheads would no longer exist.

FIRST USE

34. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, first use of nuclear weapons is an ambiguous element of U.S. nuclear policy. Should it remain ambiguous?

Dr. GALLUCCI. Yes.

Dr. DRELL. I believe it should remain ambiguous to the extent that we say that first use of nuclear weapons would be determined by a policy of "defensive last resort." I do not support an explicit statement of "no first use," although I can think of no circumstance now which would clearly call for first use. However I don't have confidence that I can anticipate all possible circumstances and therefore I think one should be clear that we view these as weapons only for "defensive last resort." Statements stronger than that have the deficiency at anticipating how one would behave in extreme circumstances. That is hazardous and I wouldn't be confident that an adversary would stick by such a pledge either.

Dr. PAYNE. U.S. policy is not ambiguous nor should it be so. The United States retains the first use option for the purposes of deterrence and assurance.

35. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, are there credible scenarios in which the United States would use a nuclear weapon in the first instance?

Dr. GALLUCCI. There are scenarios, but they are not particularly credible. The threat from the Warsaw Pact is no more, but one could just barely imagine a conventional conflict in Asia involving China in which we could not defend our allies or our forces without using or threatening to use a nuclear weapon first.

Dr. DRELL. I can think of no credible scenario at this time in which the United States would initiate first use of a nuclear weapon.

Dr. PAYNE. There are plausible scenarios. For example, with very limited U.S. defensive capabilities and in the continuing absence of non-nuclear capabilities for long-range prompt global strike, upon tactical warning of a WMD missile launch, the only option for preventing a WMD strike against U.S. cities could be first use against the enemy's missile launch sites.

36. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, would first use escalate or de-escalate a conflict?

Dr. GALLUCCI. This is unknowable, but the hope would be that by having escalation dominance, it would de-escalate.

Dr. DRELL. This would be such an historically unprecedented move that there is no previous experience to give guidance to trying to answer that question. My greatest fear is that, in the confusion of a conflict where not all data is accurately determinable, an exchange could escalate due to faulty information about the size, number, and impact of the first events. The initial shock might also paralyze any further action. I just don't know but I wouldn't bet on it.

Dr. PAYNE. Either is possible, depending on the circumstances. The risk of escalation would have to be compared to the risk of American cities being destroyed if the U.S. chose to await the opponent's first use.

NEGATIVE SECURITY ASSURANCE

37. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, a longstanding United States policy has been not to attack with nuclear weapons a non-nuclear weapon state unless that non-weapons state aligns with a state that attacks the United States with a nuclear weapon. Is this negative security assurance still a valid policy doctrine?

Dr. GALLUCCI. Yes.

Dr. DRELL. Yes.

Dr. PAYNE. The statement is incorrect. The Clinton administration rightly claimed the right of U.S. "belligerent reprisal" in the event of an attack against the United States involving a non-nuclear state's use of chemical or biological weapons. This Clinton administration position was and remains prudent.

MOSCOW TREATY

38. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, under the Moscow Treaty the United States and Russia agreed to operationally deploy no more than 1,700–2,200 nuclear weapons by 2012. But the Treaty is non-binding, as it has no duration, and is non-verifiable. Each side is free to determine when a weapon is operationally-deployed. Should the Treaty be modified? For example, should it be modified to be durable?

Dr. GALLUCCI. The treaty should be made a treaty as we have understood such treaties, that is, with specific numbers to be achieved well within the duration of the treaty, with important ambiguities resolved, and with verification provisions.

Dr. DRELL. Yes. The verification provisions for the Moscow Treaty rely on START II which expires in 2009. These provisions should be extended beyond that date, and should be made more specific in terms of which systems are being counted, and including restraints on the non-deployed Reserve Forces, that currently number perhaps up to twice as many as the deployed ones.

Dr. PAYNE. The statement again is incorrect. The Moscow Treaty is binding and is as verifiable as other treaties with the applicable verification provisions of START I. The Treaty's ceilings or further reductions could be made to extend beyond 2012. Whether this would be prudent or imprudent will depend on the geopolitical conditions at the lime and their outlook for the future.

39. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, is it possible to accelerate the reductions in deployed nuclear weapons under the Treaty?

Dr. GALLUCCI. I cannot comment.

Dr. DRELL. Yes, and I recommend that reductions proceed along the lines discussed in my answers to questions 27 and 28, and more fully in my article with

Goodby “What Are Nuclear Weapons For?”, where we spell out a specific deployment scheme.

Dr. PAYNE. Yes, in principle. The NPR called for periodic assessments of the geopolitical and technical conditions pertaining in the future to help determine whether these conditions would permit the prudent acceleration of reductions or not.

40. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, when the Senate was considering the Moscow Treaty, administration witnesses testified that verification provisions were not needed in the Moscow Treaty because the provisions of the START could be used. The START expires in 2009, before the Moscow Treaty goes into effect in 2012. Should the START be extended?

Dr. GALLUCCI. Yes.

Dr. DRELL. Yes, for reasons above.

Dr. PAYNE. I believe that portions of the START I verification provisions should be extended.

41. Senator BILL NELSON. Dr. Gallucci, Dr. Drell, and Dr. Payne, the Moscow Treaty talks about the number of warheads deployed, what about the number of warheads not deployed. Currently there are about four warheads in reserve for every warhead deployed. What will enable a reduction in the ratio of deployed to reserve warheads?

Dr. GALLUCCI. I cannot comment.

Dr. DRELL. In order to reduce the ratio of Reserve to deployed warheads one would need to add verification provisions including transparency measures. In answer to an opposite question to reduce the ratio deployed to Reserve Forces, one could remove prompt launched procedures from the warheads on the actively deployed systems. One scheme for this was spelled out in Drell and Goodby, referred to earlier, which suggested working toward a force structure with Reserve warheads only, numbering 500. Many measures have been discussed such as removing warheads from the ICBMs, in the same way that bombs have been removed from the bomber force which is no longer on standing alert. Many other schemes have been proposed. All would require greater transparency in dealing with the Russians in order to make sure that reciprocal actions are taken in parallel.

Dr. PAYNE. Most obviously, the timely development and deployment of the RRW.

QUESTION SUBMITTED BY SENATOR JEFF SESSIONS

AGING-RELATED ISSUES IN THE ENDURING STOCKPILE

42. Senator SESSIONS. Dr. Drell, your testimony during the hearing seemed to indicate that because recent reviews of plutonium aging concerns have projected longer pit lifetimes, aging-related issues will not manifest in the stockpile and are not a matter of urgency. Were your comments exclusive to plutonium aging concerns or did you mean to indicate that you are not aware of any aging-related concerns bearing on any of the warhead components or materials?

Dr. DRELL. I know of no significant aging affects showing a deterioration of the warheads over time, but we must be vigilant in looking for such effects. I believe we must continue a strong stockpile stewardship and life extension program that maintains detailed scrutiny for unanticipated aging effects showing up. We must be prepared to see any warning signs of aging that may arise, and to respond to them as needed, in order to retain confidence in our nuclear deterrent.

[Whereupon, at 12:32 p.m., the subcommittee adjourned.]

○